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SPECIAL ARTICLE.

FURTHER OBSERVATIONS ON THE ANATOMY OF THE DUODENUM.

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One year ago I directed attention to an anatomical condition of the duodenum, which consists in a marked thickening of the circular muscle fibres of this portion of the alimentary canal at a point below the entrance of the common duct. This was proved by a large number of dissections.

A considerable variation was found in the exact position of these muscle fibres. In some instances they were arranged in a narrow circular band forming a distinct sphincter; in other instances the thickening was diffused, making a broad, circular band; and in a few instances the thickening was in two different bands, with an intervening portion in which the circular muscle fibres were of the same thickness as the remaining portion of the duodenum.

There was a further difference in the location of this duodenal sphincter; in most specimens it was located from 3 to 10 c.c. below the point of entrance of the common duct, while in a few instances a portion of the sphincter included a point of entrance of the common duct, the remaining portion, however, being always located below this point.

This arrangement of circular muscle fibres was shown by a number of drawings made of the exact size of specimens when they were taken from the cadavers.

These conditions seem to explain a number of physiological facts: the fact that vomiting when the stomach is relatively empty always expels a certain amount of bile; and the fact that in many cases in which there is a dilatation of the stomach without constriction of the pylorus, with an ulcer in the pyloric end, the ulcer frequently extends into the duodenum. It may also explain some of the stomach symptoms which are so constantly observed in connection with gallstone disease. It will also explain a condition not infrequently encountered in operating for the relief of gallstones and ulcer of the stomach; that is, the presence of a greatly distended duodenum, with a completely contracted first portion of the jejunum.

It also explains the presence of the bile-staining of the portion of the duodenum above the common duct in the cadaver, while the portion below this point is usually free. This condition has been noted by many observers.

It has seemed to me as though this arrangement of circular muscle fibres served the purpose of a sphincter to facilitate the process of mixing the bile and the pancreatic juice in the duodenum; which has been so perfectly described by Dr. Walter B. Cannon.[1]

The presence of a gastric ulcer in a considerable proportion of patients that have suffered from chronic appendicitis may have some relation to this condition in the following manner: there is undoubtedly an obstruction of the ileocæcal valve, due to the physiological contraction of this sphincter during an acute exacerbation of appendicitis, for the purpose of establishing a condition of rest in this vicinity. This is followed by nausea and vomiting, and it seems reasonable to suppose that the ileocæcal valve initiates return peristalsis and that this in turn excites a contraction of the duodenal sphincter and the pyloric sphincter, and that in this way a normal passage of food from the stomach into the intestines is interfered with, causing an accumulation of residual food in the stomach, and that the irritation caused in this manner may be an etiological factor in the production of gastric ulcer. It may also explain the presence of bile in the vomitus of patients suffering from intestinal obstruction.

During the past year Dr. John T. Finney[2] and Dr. William J. Mayo[3] have referred to this condition in their writings, and I have added a few cases to my list published one year ago, which I will report in this paper.

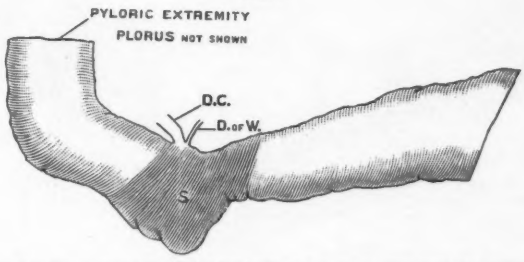
Since the publication of my last paper my assistant, Dr. E. W. Thuerer, has carefully examined the duodenum of twenty-nine cadavers in the dissecting-room of the Medical Department of the University of Illinois, and has confirmed the observations made

[1] Annals of Surgery, May, 1905.
[2] Dilatation of the Duodenum, Boston Medical and Surgical Journal.
[3] Jour. Amer. Med. Assoc., October 12, 1905.

last year. He has made full sized drawings of twelve duodeni of all the varieties in arrangement of muscle fibres that he has encountered during this year—choosing the most typical specimens of the entire number examined.

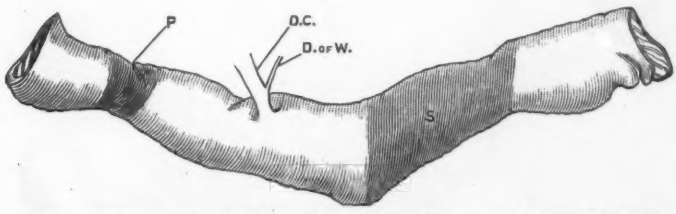
I reproduce herewith eight of these drawings (Figs. 1 to 8), each with its accompanying description. It seems to me that a study of the arrangement of circular muscle fibres of the duodenum is of sufficient importance to demand some attention. In the meantime we have made a study of other anatomical facts connected with this intestine, but confine this report to this one feature espe-

FIG. 1



Specimen showing a single sphincter beginning at a point even with the upper margin of the entrance of the common bile duct and extending downward 3 cm.: D. C., common duct; D. of W., duct of Wirsung; S., sphincter.

FIG. 2



Specimen showing a broad sphincter 4 cm. below the entrance of the common bile duct: D. C., common duct; D. of W., duct of Wirsung; S., sphincter; P., pylorus.

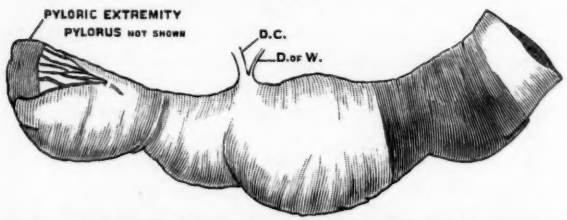
cially, because it seems to have been almost completely neglected in the studies which have been made of this portion of the alimentary canal.

We have made a series of observations in a number of the lower animals, including the cat, dog, pig, guinea-pig, rat, chicken, and pigeon, which seems to point toward some interesting anatomical facts connected with the duodenum of the herbivorous and carnivorous animals. It will, however, require a much larger number of observations than have been made at the present time to warrant definite conclusions. We will consequently defer a consideration of this portion of the subject until some future time.

I append a synoptical statement of the case histories of sixteen patients operated upon during the last year, in whom there was dilatation of the upper portion of the duodenum.

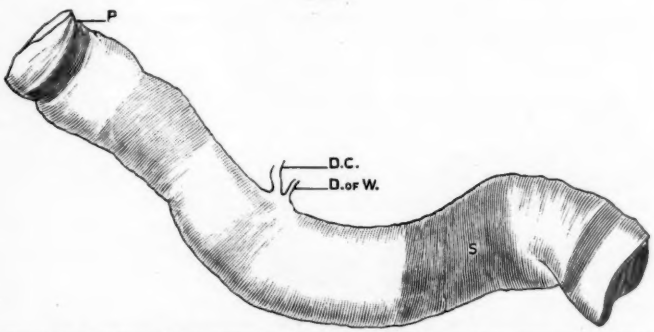
CASE XV.—Female, aged forty-eight years. *Symptoms:* pain in epigastrium, radiating to the back; slight tenderness in the epigastrium. Was operated upon for gallstones and appendicitis four years previously. *Diagnosis:* gastric ulcer; cholecystitis. *Operation,* May 26, 1905; pylorectomy; cholecystostomy. The pylorus

FIG. 3



Specimen showing a broad sphincter 4 cm. below the entrance of the common bile duct, with marked dilatation of the duodenum above this point: D. C., common duct; D. of W., duct of Wirsung.

FIG. 4



Specimen showing a broad sphincter 5 cm. below the entrance of the common bile duct: D. C., common duct; D. of W., duct of Wirsung; P., pylorus; S., sphincter.

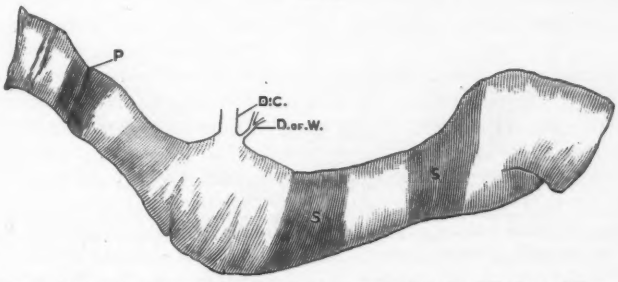
was adherent to the omentum, and the omentum to the anterior abdominal wall; there was a scar of an old ulcer on the posterior wall of the stomach; the duodenum was dilated, and the jejunum contracted.

CASE XVI.—Female, aged sixty years. *Symptoms:* constipation and diarrhœa; excessive abdominal distention. *Diagnosis:* cholecystitis; intestinal obstruction. The patient had also multiple cysts of the left kidney. *Operation,* August 4, 1905; cholecystostomy. The peritoneal cavity contained free bile; there were bands

of adhesions between the omentum and the large bowel; the duodenum was enormously distended.

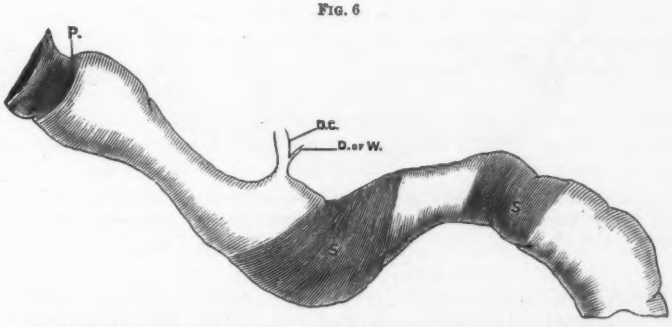
CASE XVII.—Female, aged twenty-nine years. *Symptoms:* burning pain in the epigastrium; frequent vomiting ; palpitation of the heart; tenderness in the upper epigastrium. *Diagnosis:* gastric ulcer; appendicitis. *Operation,* August 24, 1905; appendectomy. The point of the appendix was adherent to the uterus, and its distal end contained green pus; there was a chronic ulcer at the pylorus; the duodenum was enlarged.

FIG. 5



Specimen showing two narrow sphincters: D. C., common duct; D. of W., duct of Wirsung; S. S., sphincters; P., pylorus.

FIG. 6



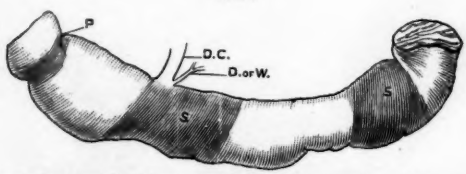
Specimen showing two sphincters with an interval of 3 cm.: D. C., common duct; D. of W., duct of Wirsung; S. S., sphincters; P., pylorus.

CASE XVIII.—Female, aged forty-five years. *Symptoms:* epigastric pain, vomiting, and jaundice; pain in the left epigastrium; slight tenderness over McBurney's point. The patient had been operated upon for gallstones two years previously; there was relief for a short time; then recurrences of the symptoms. *Diagnosis:* cholecystitis; pancreatitis. *Operation,* August 28, 1905; cholecystostomy. There was thick mucus in the gall-bladder; the pancreas was nodular; the duodenum was dilated.

CASE XIX.—Female, aged eighteen years. *Symptoms:* loss of appetite and of weight. A gastroenterostomy had been done one year previously. Tenderness persisted at the upper end of, and one inch above, the incision. *Diagnosis:* gastric ulcer; dilated duodenum. *Operation,* August 28, 1905; enlarged the opening of the previous gastroenterostomy; anastomoses of the previous gastroenterostomy. The duodenum was greatly distended.

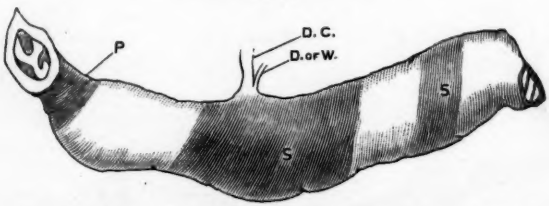
CASE XX.—Female, aged twenty-eight years *Symptoms:* previous nervousness and stomach trouble. Now complains of variable appetite, palpitation in the epigastrium, tenderness in the centre

FIG. 7



Specimen showing one broad sphincter just below the entrance of the common duct and a second sphincter 5 cm. farther down: D. C., common duct; D. of W., duct of Wirsung; S. S., sphincters; P., pylorus.

FIG. 8



Specimen showing a broad sphincter beginning 1 cm. above the entrance of the common bile duct and extending 3 5 cm. below the duct, and a narrow sphincter 2 cm. lower down: D. C., common duct; D. of W., duct of Wirsung; S. S., sphincters; P., pylorus.

of the epigastrium, constipation, and nervousness. *Diagnosis:* gastric ulcer. *Operation,* August 23, 1905; gastroenterostomy. There was an ulcer in the region of the pylorus; the gall-bladder was empty; the duodenum was congested.

CASE XXI.—Female, aged fifty-eight years. *Symptoms:* burning pain in the epigastrium; constant nausea; vomiting and abdominal tenderness, especially marked in the epigastrium. A hysterectomy had been done six years previously. *Diagnosis:* gastric ulcer: dilated duodenum. *Operation,* August 28, 1905; pylorectomy; gastroenterostomy. An ulcer was found near the pylorus; the duodenum was dilated; there was a small nodule in the fundus of the gall-bladder.

CASE XXII.—Male, aged thirty-seven years. *Symptoms:* pain in the hypochondrium extending to the back and shoulders; fever. Examination of the abdomen was negative. *Diagnosis:* cholecystitis; dilated duodenum. *Operation,* October 11, 1905; cholecystostomy. The gall-bladder contained sandy fluid; the duodenum was dilated; the appendix was held by recent adhesions.

CASE XXIII.—Male, aged sixty-four years. *Symptoms:* epigastric distress; bloating; constipation; tenderness above umbilicus; emaciation; anæmia. *Diagnosis:* ulcer of the duodenum. The patient also had a right inguinal hernia. *Operation,* October 25, 1905; pylorectomy. The scar of an old ulcer extended a short distance into the pancreas and the duodenum—probably carcinomatous; the duodenum was dilated below the ulcer.

CASE XXIV.—Female, aged twenty-seven years. *Symptoms:* gaseous distention of the abdomen; constant pain; vomiting; definite and excessive tenderness in the middle of the epigastrium. *Diagnosis:* gastric ulcer; cholecystitis; appendicitis. *Operation,* November 17, 1905; gastroenterostomy; appendectomy. There was an ulcer on the posterior wall of the pylorus extending into the duodenum; the gall-bladder was distended with 15 c.c. of black, sandy bile; the duodenum was dilated; the appendix was adherent to the right ovary, and was distended with fluid.

CASE XXV.—Male, aged forty-four years. *Symptoms:* pain in the epigastrium after eating; rigidity of the abdomen; anæmia; emaciation. *Diagnosis:* ulcer of the stomach. *Operation,* November 27, 1905; gastroenterostomy. An ulcer, 15 cm. in diameter, was located in the cardiac and posterior wall of the stomach; the duodenum was dilated; the lymphatics were enlarged.

CASE XXVI.—Female, aged twenty-four years. *Symptoms:* gastric pain; nausea; hæmatemesis; attacks of colic; extreme tenderness in the middle epigastrium. *Diagnosis:* gastric ulcer; cholecystitis. *Operation,* November 27, 1905; gastroenterostomy. There was a wide open ulcer opposite the entrance of the common duct; the pylorus and the duodenum were dilated; the gall-bladder was distended, and contained 50 c.c. of black, sandy bile.

CASE XXVII.—Female, aged twenty-seven years. Severe pain in the abdomen; vomiting; fever; tenderness beneath the right costal margin and over McBurney's point; neurasthenia. *Diagnosis:* ulcer of the stomach and the duodenum. *Operation,* December 15, 1905; gastroenterostomy; appendectomy. There was an ulcer of the duodenum; the stomach was dilated, and twisted on itself, and contained considerable fecal matter.

CASE XXVIII.—Male, aged thirty years. *Symptoms:* abdominal pain; general abdominal sensitiveness; insomnia. *Diagnosis:* gastric ulcer. The patient has been operated upon, five years previously, for appendicitis and intestinal adhesions. *Operation,* December 15, 1905; gastroenterostomy. There was an ulcer on the

posterior wall of the pylorus on the duodenal side; the stomach and the duodenum were dilated.

CASE XXIX.—Female, aged thirty-five years. *Symptoms:* pain in the right iliac region; abdominal distention; fever; anæmia. *Diagnosis:* gastric ulcer; cholecystitis. *Operation*, December 13, 1905; gastroenterostomy; appendectomy. There was an ulcer near the pylorus; the duodenum was distended; the gall-bladder was distended with 10 c.c. of black, sandy fluid; the appendix was cicatricial, 4 cm. long.

CASE XXX.—Female, aged thirty-eight years. *Symptoms:* continual pain in the stomach; tenderness in the epigastrium; hæmatemesis; headache. A gastroenterostomy had been done six months previously. *Diagnosis:* pyloric ulcer; dilated duodenum; cholecystitis. *Operation*, December 29, 1905; cholecystostomy. The pylorus was indurated; the duodenum was enlarged and adherent.

CASE XXXI.—Female, aged twenty-nine years. *Symptoms:* continual gastric pain; epigastric tenderness. The patient had been operated upon one year previously for gastric ulcer. The pain recurred. *Diagnosis:* pylorospasm; dilatation of the duodenum. *Operation*, January 1, 1905; gastroenterostomy—the opening enlarged. The gastric side of the pylorus was constricted; the duodenum was dilated.

ORIGINAL ARTICLES.

THE SUFFICIENCY OF SIMPLE INTERCOSTAL INCISION IN ACUTE EMPYEMA, WITH A REPORT OF FIVE CASES.

BY JAMES FARQUHARSON LEYS, M.D.,
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Now and then, in a case of flat chest, it will be found that an intercostal space affords an opening too narrow for adequate drainage of an acute empyema, and a piece of rib must be excised. Such cases are exceptional. In cases of empyema which have become chronic and in which it is evident that adequate drainage cannot be secured without excision of a portion of one or more ribs, the propriety of rib resection is not to be questioned. Such removal of bone is required in cases in which it has become evident that lung expansion does not proceed and cannot be hoped for as an effective aid in the expulsion of pus. Where the chronic empyema is very extensive and there is no expansion, or only a slight ineffective expansion with no improvement, one of the extensive exsections first brought forward by Estlander and Schede is indicated; the lung being firmly

fixed in its contracted position by adhesions and failing to expand to meet the chest wall, the chest wall must be enabled to fall in and meet the lung as the only way of securing the obliteration of the pus cavity. These somewhat formidable looking operations have been remarkably successful in suitable cases and their place in surgery is well established.

So well established, indeed, is the operation of rib resection in suitable cases of empyema, that it has come to be the first operation thought of by most practitioners as soon as the diagnosis has been established. The operation which involves a removal of bone has somehow taken a dominant position in the minds of medical men, and the operation which is as much simpler, as it is more suitable in the majority of acute cases, is too often lost sight of.

When suppuration supervenes in what was originally, and has for some considerable time remained, a serofibrinous pleurisy, or when the clear or slightly turbid fluid of a tuberculous pleurisy at last becomes frankly purulent, the lung has been long contracted, in many cases its elasticity has been permanently impaired, thick coagula are deposited upon the walls of the pleural pus cavity, and firm adhesions already exist, preventing expansion of the lung. In such cases of subacute and chronic empyema, rib resection will probably be required to secure adequate drainage.

Probably the majority of cases of empyema, however, are acute in their origin and course, the condition being a sequel of an acute infectious disease. Purulent pleurisy is thus a common sequence of scarlet fever and typhoid fever, and a rarer one of measles and whooping cough. It has its origin sometimes, of course, in a penetrating wound of the chest or some other surgical injury. But in a very large proportion of the cases, probably the majority, acute empyema is a sequel of pneumonia, and invasion of the pleura by the pneumococcus constitutes in such cases the dominant if not the sole infection which is its cause. The majority of the acute empyemas seen in family practice by the medical man are of this class.

It is not the purpose of this paper to bring any new fact to the notice of the profession, but to repeat and emphasize a fact which was long ago established but which for some reason seems to be periodically lost sight of; and this is that the best treatment for such cases, as soon as the diagnosis of empyema has been made on the signs and symptoms and confirmed with the exploring needle, is *simple incision through an intercostal space.*

The failure of the profession in general and the family practitioner in particular to realize this may be referable to one or another of several reasons. First, the man whose work is almost entirely medical and who is not accustomed to do any surgical work beyond the suturing of wounds and the opening of superficial abscesses cannot quite bring himself to think of thoracotomy as the minor operation which it really is. He has a feeling that in promptly

opening the thoracic cavity he would be undertaking alone a grave operation in which he ought to have the benefit of consultation and assistance. If, entertaining these doubts, he turns to the literature for help in clearing up his ideas before proceeding farther in the case, his confidence in the efficacy of the simple operation, and in his own ability to perform it without at least some special instruments or materials not contained in his bag, is apt to be still further shaken by what he reads. In some standard text-books published within the past five years resection of bone in all cases, acute as well as chronic, is represented as advisable without, apparently, any weighty or valid reason for such an opinion.

The reasons sometimes stated are (1) that the removal of a small piece of rib will enable the operator to introduce a finger into the pleural cavity and break up any adhesions encountered, thus favoring drainage; and (2) that the chest wall will be enabled to collapse to a certain extent and meet the lung in the obliteration of the pus cavity. Against these alleged advantages it must be said (1) that in the acute empyemas following immediately upon lobar pneumonia pleural adhesions have not commonly formed; and if adhesions have formed, those encountered and broken up by the exploring finger might well be those at the margin of the pus cavity concerned in limiting its extent and in no way interfering with drainage, and their breaking up could only be harmful as permitting further extension of the suppurative process in the pleura. And (2) the removal of a few inches of one rib does not enable the chest on the affected side to fall in to any considerable extent, and a resection sufficient to bring about such collapse and consequent permanent deformity is not necessary to the cure of these acute cases and, therefore, not to be desired. Furthermore, in cases in which the pneumococcus is not the sole or even the dominant infecting organism, but in which there is a mixed pyogenic infection, sometimes of a specially virulent type, osteitis or periostitis has resulted in the bone exposed by an unnecessary resection in several reported cases.

In most of the literature of the past fifteen years some special forms of apparatus, intended to exclude air, or to secure drainage by siphonage or suction, or to provide for irrigation of the cavity, are described as desirable. It may be readily conceded that there is no objection to the use of specially contrived drainage tubes, single and double, long and short, flanged to prevent their recession into the chest, or provided with siphon attachments, if such contrivances as these are at hand. But they are seldom at hand outside of a hospital, and in any and all cases they are quite unnecessary. If because of a fancied necessity for some such appliances, or a mistaken belief that simple thoracic incision is not a sufficient and effective operation, or a fear that it is too serious a one to be undertaken unaided, or because of a lack of practice in and a feeling of timidity toward surgical procedures in general, or for any other reason,

the isolated medical man hesitates in these acute empyemas, his hesitation will be confirmed when he encounters reports of cases in which pleural collections of pus have been happily absorbed and complete recovery has ensued without surgical interference. By these reports he will be still further enabled to justify his hesitation to his own conscience and be encouraged to hope that this excessively rare outcome may ensue in the case which he has on his hands.

Resection of a rib, then, as already stated, is not only quite unnecessary, but positively undesirable in practically all acute empyemas. Before the profession arrived at a rational treatment of acute empyema by simple incision for the evacuation of pus, two other erroneous ideas, entertained at first on theoretical grounds, had to be abandoned. One was that the opening must be so made and dressed as to prevent the entrance of air; the other, that irrigation of the cavity with an antiseptic fluid would disinfect it and was necessary to advance the cure. These errors, being apparently based on sound theory, died hard. As regards the exclusion of air from the cavity the idea that this was necessary was based on a false physiological teaching that the expansion of the lung depended entirely on the maintenance of the pleural vacuum. It is now well known that the lung has a natural tendency to expand, and if its tissue be not seriously diseased it will exercise this vital function of expansion against a normal atmospheric pressure outside, if not forcibly prevented from doing so. Air exclusion was later insisted on as necessary to prevent fresh infection of the pleura by germs which would be carried in. This argument belonged to the era when antiseptic theory had taken a firm hold on the profession but a rational antiseptic practice had not yet been developed. It was of the era in which operations were performed and babies delivered under the carbolic spray. We now know that pus may be allowed to flow out freely and air to enter as freely, through an open drainage tube between the ribs, with no likelihood that the entering air, strained through an ample dressing of many layers of gauze which had been sterilized by heat and wrung out of bichloride solution, will introduce any fresh infection. The notion that antiseptic irrigation of the cavity could be effective for its disinfection was based upon an erroneous idea as to the penetrating and germ-destroying power of a weak antiseptic solution in brief contact with the surface of infected tissues. Not only is its disinfectant power insignificant under such circumstances, but in irrigation a pressure is apt to be exerted by the liquid, the effect of which is to distend the contracting cavity repeatedly to its original dimensions, to prevent the formation or the permanency of new adhesions and the holding by them of ground gained in the reduction of the cavity; and even, if too great a hydrostatic pressure be unintentionally brought to bear in the use of the syringe or the column of liquid used in irrigation, to make a harmful compression on the

expanding lung. Convulsions and sudden collapse have resulted in a number of instances.

Simple intercostal thoracotomy has been successfully performed since the time of Hippocrates and has shown itself again and again to be an adequate operation for acute empyema; and it is unaccountably strange how this fact has gained a temporary recognition only to be forgotten again while the profession groped in a confusion of ideas and in efforts to elaborate and improve surgical procedures which were as much more complicated as they were less suitable. It is interesting to trace this fact through the literature of the past two hundred years or so. In the midst of unsuccessful attempts to deal with pus in the chest by other and more elaborate procedures, someone would treat a case by simple incision. Recovery would follow, the profession would be surprised, report the case as something remarkable, and go on with aspirations, siphons, valve-like incisions, irrigating apparatus, special forms of drainage tubes, and repeated failures to deal successfully with the disease.

Thus going back to 1694, a time anterior to the beginnings of modern surgery, when the surgeon was practically a non-professional man, we find an account by Riedlinus,[1] a German physician, of a case of empyema which he treated with medicaments and with the cautery. A leech or surgeon was at last called in to bleed the patient. Though the chronicler does not think it worth while to mention the leech's name, he appears to have been a better man than his principal. His ministrations were certainly worth more to the patient. Noting intercostal swelling he made a free incision through the right fifth interspace, which was followed by the evacuation of a total of ten pints of pus within a short time following and complete cure within seven weeks. Warner,[2] of Guy's Hospital, London, in 1751, made a three-inch incision in the tenth interspace four inches from the spine, in a man of twenty-seven years, placing the patient in a sitting posture, and evacuated twenty ounces of pus. Recovery was perfect in six weeks. Isaac Rand,[3] of Cambridge, Mass., in 1756, in a case of empyema in a blacksmith, incised an intercostal space, evacuating five pints of pus at the time. He states that " the abscess and the external opening healed in sixteen days and he recovered his usual state of health." In 1783, twenty-seven years later, the man was still following his business as a blacksmith.

Such satisfactory results from so simple a procedure, though they continued to be reported from time to time, seem to have been ignored or forgotten, for in 1833 we find Prof. Joseph Pancoast[4] giving a clinical lecture on a case of empyema in which he advised caution and conservatism in dealing with it surgically, and telling

[1] Misc. Acad. Nat. Curios, Lips. et Francof., 1694, 3 decuria. i. 216.
[2] Phil. Trans. of London, 1751-52, xlvii. 407.
[3] Med. Communicat., Mass. Med. Soc., 1790-1808, Boston, 1808, i. 66.
[4] American Journal of the Medical Sciences, Phila., 1833, xiii. 93.

at the same time in the course of his lecture the following story: "A case of abscess of the chest of some interest occurred a few years ago in the upper part of this State (Pennsylvania) in the practice of a medical friend and was cured in a way somewhat *unique*, which would seem to make it worthy of recital. A man was seized with some affection within the thoracic cavity which resisted the prescriptive treatment of his physician. The stethoscope at that period had not come into general use and the case was so ambiguous that its character was not revealed by its symptoms. The patient and his friends entertained the opinion that he was laboring under pulmonary consumption. No swelling, no discoloration, existed externally upon the thorax; but the patient, from the internal sensation produced by the disease, had a settled conviction that there was a *gathering* within. Taking a seat by an unfrequented side of the house, he plunged the blade of his penknife opposite the seat of pain between the ribs. He was found with pus flowing from the wound; a large quantity was discharged from the narrow wound. From that time his symptoms were relieved and the patient finally recovered."

The adequacy of treatment by simple, direct, free incision could not get itself recognized, however; and it has not been sufficiently realized yet. The profession continued to flounder in confusion regarding the treatment of empyema, many continued to advocate what they believed to be a wise conservatism, and in 1876 Dr. Goodhart, of Guy's Hospital, wrote, "It has long been known that an empyema may often be safely let alone." With the development of antiseptic surgery, however, the pendulum of opinion and practice swung too far the other way and has not yet returned to rest.

In an able paper entitled "Rib Resection in Empyema, Indiscriminate and Excessive Practice Thereof," published in 1899, Dr. Edmund Andrews,[1] of Chicago, deplores the fact that some surgeons "go so far as to advocate the resection of ribs in all cases of empyema," and says: "They forget the splendid results we have had for twenty-five years in cases that do not need resection. When we learn some new thing in surgery we seem straightway to forget what we knew before." Dr. Andrews, while recognizing the sufficiency of simple intercostal incision without resection, still considered it desirable to have specially constructed flanged drainage tubes and recommended a double tube of the kind devised by Hancock. He advocated, too, a daily irrigation with boric acid solution and said: "In this treatment we soon learned that air in the pleural cavity had no septic influence, if the cavity itself was well wet with a mild antiseptic fluid. The germs were destroyed and the cavity remained sterile." The objections to such routine irrigation, generally unnecessary and useless and sometimes dangerous, have

[1] Journal of the American Medical Association, 1899, xxxii., 451.

been already set forth; and experience has shown that air-entrance, under a proper gauze dressing, is innocuous, independently of an irrigation which can have little or nothing to do with the cessation of the septic process in the pleura after free egress has been given to the pus. And the special drainage tube has no practical advantage over the ordinary rubber tube, always on hand, which can be fenestrated with the operator's own scissors in a few seconds and flanged with two large safety pins crossed through its outer end.

It has remained for the author of a work on the practice of medicine to state the truth as to the proper treatment of acute empyema without ambiguity and with a simplicity and conciseness not found in any surgical work which has come to the notice of the present writer. Osler[1] says: "When it has been determined by exploratory puncture that the fluid is purulent, aspiration should not be performed except as preliminary to operation or as a temporary measure. . . . It is sad to think of the number of lives which are sacrificed annually by the failure to recognize that empyema should be treated as an ordinary abscess by free incision. The operation . . . is by no means serious. A majority of the cases get well, providing that free drainage is obtained, and it makes no difference practically what measures are followed so long as this indication is met. The good results in any method depend upon the thoroughness with which the cavity is drained." It is unfortunate that such a direct statement of surgical good sense is lacking in most of the surgical text-books, and that the simple truth which it embodies has to be forgotten from time to time, only to be re-discovered and repeated in an effort to impress it upon the general practitioner.

The following five cases of acute empyema were treated in the U. S. Naval Hospital at Newport between March, 1901, and October, 1902. They were all in boys between sixteen and seventeen and a half years of age. In four of them the empyema was an immediate sequel of lobar pneumonia. A rapid and complete recovery ensued in each of these cases. In the other case, Case II, the empyema was developed from a serofibrinous pleurisy. Recovery proceeded more slowly in this case, and the patient purchased his discharge from the service before it was complete.

These five cases were all in that decade of life in which croupous pneumonia has the lowest mortality. All except Case I were boys of robust physique. They may be considered, therefore, to constitute a rather favorable series. The five cases were consecutive, and they were the only ones occurring in the hospital during the two years of my service. None of our fatal cases during that two years had empyema. We had, during that time, about one hundred and ten cases of croupous pneumonia, nearly all in the second decade of life, with eight deaths; and the fact that empyema was never over-

[1] Practice of Medicine, New York, 1896.

looked in such a large series convinced me that its diagnosis is easy and that failure to recognize it ought practically never to occur.

Though these five consecutive cases were all treated in a hospital where every appliance was on hand or easily obtainable, and where professional assistance could be had if needed, they were handled with the help of one or two nurses, without professional assistance (except in one case), without general anæsthesia, and without any special appliance; that is to say, they were treated precisely as every medical man should be prepared to manage a case in his practice. Local anæsthesia was produced with a lump of ice dipped in coarse salt and held against the chest, or with a spray of ether from a hand atomizer, or with a spray of ethyl chloride if a tube of it was at hand. The patient was propped with pillows into a sitting posture. The only implements used were (1) a scalpel for incision, (2) a pair of blunt straight scissors for enlarging it, (3) two pairs of hæmostatic forceps to hold it open for the flow of pus, to introduce and advance the drainage tube, and to catch bleeding vessels if they were encountered, (4) about twelve inches of three-eighths inch rubber drainage tubing fenestrated on alternate sides at intervals of an inch, and (5) four large safety pins at least two inches long. All these articles, the dressings, and the patient's skin were, of course, duly sterilized beforehand.

Case I.—E. J. M., apprentice, aged seventeen years, enlisted at New Orleans. Admitted to hospital March 4, 1901. Croupous pneumonia, left lower lobe. A few days before admission had been surveyed for impediment in speech, mental weakness and poor physique. March 17th, signs of effusion in right pleura. Temperature declined irregularly and was normal March 18th, 19th and 20th. March 20th, exploration showed effusion to be serous. Effusion increased very rapidly and fever returned. March 24th, effusion reached clavicle and aspiration removed 1925 c.c. of creamy pus. March 25th, patient propped in sitting posture; under local spray of ether from hand atomizer, free incision in sixth interspace near posterior axillary line. Two fenestrated tubes six inches long inserted. About 1500 c.c. more of pus removed at operation. Temperature fell to normal. Good drainage maintained. Daily dressing. Pulmonary gymnastics with Ralston James water bottles begun March 31st. Liberal diet and tonics. By April 15th, daily discharge amounted to only two ounces. Tubes shortened little by little. One tube removed April 19th. Pus showed no tubercle bacilli; pneumococci and other cocci abundant. Discharge did not cease until May 12th. May 14th, last tube removed. Gymnastics continued. Fistula healed completely May 24th. Cure perfect. Discharged from service well fleshed and in excellent health except for the defects for which he had been surveyed previous to his illness.

Case II.—T. De W. T. E., apprentice, aged sixteen years, enlisted at Chicago. Admitted to hospital November 5, 1901.

Acute pleurisy, left side. Temperature 103.6°, pulse 120, respiration 36. Friction heard. Temperature declined; effusion appeared and by November 10th reached the clavicle. Aspirated 1250 c.c. of flocculent serum, very slightly purulent. Moderate fever continued. November 16th, aspirated 700 c.c. of dark thin pus, which deposited a sediment of pure thick pus amounting to one-fourth of its volume after twenty-four hours. November 21st, aspirated 950 c.c. thick creamy pus. November 22, patient being propped in sitting posture, a piece of ice dipped in salt being used for local anæsthesia, free incision in sixth interspace left side just anterior to latissimus dorsi. Two fenestrated tubes, seven and eight and a half inches long, inserted. Free discharge. Ralston James exercise begun November 23d. Tubes shortened constantly and removed December 3d. Wound appeared to be healing, but fever recurred, and fluid being evident it was reopened December 17th with discharge of about 500 c.c. of pus. Eight inch tube inserted. Pus discharge continued in varying quantity and pulmonary expansion progressed very slowly. On March 21st he was progressing satisfactorily, the discharge being very little and the patient steadily gaining flesh and strength, when, by his own desire, he was discharged from the service that he might complete his recovery at home.

Case III.—B. F. D., apprentice, aged sixteen years and four months, enlisted at Port Royal, S. C. Admitted to hospital March 13, 1902. Croupous pneumonia, right lower lobe. Crisis March 22d. Temperature rose again and took on a septic course. Pleural effusion appeared. March 30th, exploratory aspiration found pus. March 31st, patient propped in sitting posture, ice and salt for local anæsthesia, free incision in sixth interspace in front of latissimus dorsi, large amount of pus evacuated. One tube. April 2d, developed a parotitis (epidemic on the station at the time). Parotid swelling nearly gone by April 6th. Ralston James exercise. Tube progressively shortened. Forced out by fully expanded lung on May 7th. Continued to do well, gaining one-half pound daily on full diet. July 10th, he had completely recovered his health and strength and was discharged to duty. On July 13th he came down with measles, which was epidemic at the time.

Case IV.—H. W. S., apprentice, aged seventeen years and three months, enlisted at New York. Admitted to hospital May 5, 1902. Croupous pneumonia right lower lobe. Crisis May 17th. Temperature took on an irregular course thereafter. June 10th, empyema diagnosed but pus not struck by exploration in axilla. Aspiration through ninth interspace just under angle of scapula evacuated about 500 c.c. of pus. Later on the same day, free incision in this situation under ethyl chloride local anæsthesia, with patient in sitting posture. Rubber tube eight inches into chest. This was connected with long tube terminating in bucket of boric acid solution

colored with methyl blue on floor beside bed, with interruptions of glass tubing at two points, near wound and near bucket, to observe flow of pus, siphon drainage being thus established. No aspiration of the solution in the bucket occurred. An excellent and steady flow of pus was maintained and Ralston James exercise practised. The apparatus was removed on June 18th, and a short tube left in with simple dressing. Tube left out July 10th. July 16th, no discharge, no fever. July 25th, entirely healed, no dressing, gaining flesh rapidly. Discharged to duty August 9th; recovery complete.

Case V.—R. H. B., apprentice, aged sixteen years and eight months, enlisted at Saginaw, Mich. Admitted to hospital August 24, 1902. Croupous pneumonia, left lower lobe. Crisis, September 1st, followed by irregular temperature. Pleural effusion developed. September 13th, aspiration sixth interspace in midaxillary line drew 100 c.c. of pus. Next day, September 14th, patient propped to sitting posture, local anæsthesia with ethyl chloride, free incision same situation, about 350 c.c. pus withdrawn. Two tubes introduced. Ralston James exercise. Expanding lung pushed out the last of a shortened tube October 4th. Wound healed by October 15th. Recovery complete, and discharged to duty, October 27th.

TRAUMATIC INTRAPERITONEAL RUPTURE OF THE BLADDER:

WITH A REPORT OF TWO CASES AND AN ANALYSIS OF ONE HUNDRED AND TEN CASES TREATED BY LAPAROTOMY.

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Having had occasion recently to operate on a patient with an intraperitoneal rupture of the urinary bladder, an operation which is rather rare even in these days of hourly abdominal sections, I have thought it worth while to record the case, and to present a statistical study of all the similar operations, one hundred and ten in number, of which reports have been found.

Of the three patients with this lesion that I have myself observed, the first was operated on by my father at the Pennsylvania Hospital while I was still an undergraduate, and was reported by him to the Philadelphia Academy of Surgery in 1898; while the two others came under my notice at the Episcopal Hospital, and have not hitherto been published.

Case I.—Otto N., German, aged fifty-one years (No. 2449, P. E. H., 1904) was brought to the Episcopal Hospital shortly after mid-

night on the morning of October 24, 1904. He was admitted to the service of Dr. Richard H. Harte, to whom I am indebted for the privilgee of operating, and of reporting the case.

The patient had been drinking on Saturday evening, October 22d, and on his return home that night fell on the street and against the door-steps. He had passed his urine about 6 P.M., and thinks he fell about 9 P.M. He felt immediately sharp epigastric pain, and was helped into bed, where he slept off his intoxication. A physician who was called to see him the next (Sunday) morning, passed a catheter, but drew only a little blood, and the patient was not relieved of his desire to urinate, which he had been totally unable to do since the accident. Purgatives were administered, but failed to open the bowels; the patient vomited everything, and finally the vomitus became fecal in character. His belly swelled up, was intensely tender, and the patient suffered great pain. Toward midnight his physician sent a note to the hospital, requesting that the ambulance be sent for the patient, whose malady he had diagnosed as intussusception.

On admission to the hospital, I found the man's abdomen very much distended, and extremely tender throughout. Rigidity was not very pronounced, owing to the great distention. There was dulness in the hypogastrium and the flanks, and the level of this dulness changed with the position of the patient. He vomited from time to time bile and black fluid, not very fecal, yet not altogether characteristic of blood. Examination of the lungs detected a few rales in the bases posteriorly. The heart appeared normal. The pulse was 120 and peritonitic in type. The temperature was 97.8° F.

A rubber catheter was passed, but nothing ran. The bladder was then injected with almost one quart of hot boric acid solution. None of it returned, nor was any appreciable change made in the hypogastric dulness. On withdrawing the catheter, its eye was seen to be plugged with a blood clot. The catheter was, therefore, again passed, and five and one-half pints of bloody urinous fluid were withdrawn. The fluid continued to dribble out, and as no material change was produced in the level of the hypogastric dulness, even by the evacuation of this large qantity, it was concluded that the urine was slowly draining from the peritoneal cavity through a rent in the bladder. The urine was so very bloody, however, that I suspected active hemorrhage from some other source within the abdomen. An enema was effectual in moving the bowels, and the patient was prepared for operation.

Laparotomy was done at 2 A.M., thirty hours after the injury. An incision of about two inches in length was made in the left rectus muscle, in the hypogastric region, close to the linea alba. The abdominal fat was one inch in thickness, and there was also at least one inch of peritoneal fat. A very fatty omentum pre-

sented in the wound, and almost immediately bloody urinous fluid welled up. The incision was then extended down to the pubes, and subsequently upward, its total length reaching five inches. The pelvis was full of this fluid, and nothing could be seen; blood clots floated up from the flanks. The small intestines were seen to be intensely congested, so I sought in them for the seat of hemorrhage, and found the under surface of the mesentery greatly lacerated and bleeding freely. This appeared to be about three or four feet from the ileocæcal juncture—probably the coil of ileum which normally lies in the pelvis, and which, I presume, was crushed against the spinal column by the vulnerating force. The bleeding from the mesentery was readily controlled by the application of a few purse-string sutures, and I then found that the serous coat of the ileum, a few inches farther down, was split off the bowel transversely, from one mesenteric attachment to the other, in several places. A few Lembert sutures were, therefore, introduced to try to overcome the defect, but without much success, as the bowel was so greatly distended, and I was fearful of prolonging this, the introductory stage of the operation.

Having thus checked the hemorrhage, I mopped out the pelvis, and by lowering the head of the table, and packing off the intestines with gauze, was at last able to see the rent in the bladder, which was on its posterior wall, and seemed to start extraperitoneally between the rectum and bladder, on the patient's right, and to slant forward nearly anteroposteriorly almost to the median line, its whole intraperitoneal length being between three and four inches. The bladder was collapsed, and the rent seemed so large in proportion to the size of the bladder that it was only the mucous lining of the two flaps, forming the lateral walls of the bladder, that enabled me immediately to recognize the condition of affairs present. With great difficulty, on account of the thickness of the abdominal walls and the deep seat of the rent in the bladder, I succeeded in placing seven interrupted Lembert sutures of silk. I inserted the superior sutures first, making the first three of the type of mattress sutures, and using them as guys to pull the bladder up toward the abdominal wound. If the patient's condition had not been so precarious I should have made all seven sutures of the mattress type, but the last four sutures were so extremely difficult to place that I was thankful to be able to insert even the ordinary Lembert sutures. The patient had meanwhile become nearly pulseless, and was being given saline solution intravenously.

The peritoneal cavity was now thoroughly irrigated with hot saline solution; a glass drainage tube was placed to the pelvis, and the upper part of the abdominal wound was closed with "through-and-through" sutures of silkworm-gut. A permanent catheter was placed in the bladder, and the patient returned to bed. The duration of the operation was fifty minutes.

The patient's pulse improved, he rallied from the ether, and became clear in his head; some nearly clear urine was drained away by the catheter; the abdominal tube was evacuated at suitable intervals, but the patient died suddenly, with dyspnœa, at 7 A.M., four hours after the conclusion of the operation. Being a Coroner's case, no autopsy was permitted.

CASE II.—George M., aged thirty-six years (No. 1559 P. E. H., 1901), on the evening of July 15, 1901, fell six feet while at work, striking his hypogastrium on a stone. He had been drinking water and beer during the afternoon, but was not intoxicated, and had eaten neither his midday meal nor his supper. He had voided his urine about one hour before the accident. He was at once brought by the patrol wagon to the Episcopal Hospital, being admitted to the service of Dr. Harry C. Deaver, to whom I am indebted for permission to report the case. The patient suffered great abdominal pain, and desired to urinate, but was unable to do so. A little bloody urine was drawn by the catheter. A pint of boric acid solution injected into the bladder was all returned. Evidences of serious intra-abdominal injury being, however, unequivocal, exploratory laparotomy was done about two hours after the accident by Dr. Deaver. The abdomen was full of blood-tinged fluid, but no urinous odor was detected. The stomach and intestines were examined and found to be uninjured. The pelvis was then examined, and a rent three inches long was discovered in the fundus of the bladder. This was closed with a continuous Lembert suture; the peritoneal cavity was thoroughly irrigated with hot saline solution; a glass drainage tube was placed to the pelvis, and a permanent catheter introduced through the urethra. The patient did well after the operation. Thirty-nine ounces of nearly clear urine were drained off by the catheter during the first twenty-four hours; the peritonitis subsided, and the abdominal drain was discontinued at the end of a week. Cystitis developed on the sixth day, but yielded to treatment, and the patient was discharged cured on the thirty-second day after admission.

HISTORICAL. The Dutch surgeon, von Roonhuysen,* in the seventeenth century, was the first clearly to describe rupture of the bladder. Bonetus† in 1679 records the case of a patient treated by paracentesis abdominis, but with fatal result. Benjamin Bell‡ in 1788 first proposed, and Walter,§ of Pittsburg, in 1862 first successfully employed abdominal section.

With the advent of antisepsis, the treatment by laparotomy and suture of the rent was placed on a sure basis, and has been the

* Medico-Chirurgical Observations, Englished out of Dutch, London, 1676, p. 120

† Sepulchretum, Genevæ, 1679, Lib. III. Sec. xxiv. Obs. 12, p. 1231.

‡ System of Surgery, 2d ed., Edinburgh, 1788, vol. v. p. 305.

§ See list of cases.

accepted method of treatment ever since. The classical statistics of Bartels* in 1878 of ninety-eight cases treated without operation with a mortality of nearly 96 per cent. became more and more unfavorable when compared with a death rate after operation of 62.5 per cent. from 1880 to 1890; of 54.28 per cent. from 1890 to 1900; and of 27.91 per cent. during the last five years.

FREQUENCY. Although, as may be seen from the first table appended to this paper, from seven to eight cases of traumatic intraperitoneal rupture of the bladder are now being reported yearly, it is still a comparatively rare accident. Conley thirteen years ago stated that among 8000 surgical cases in Cook County Hospital, Chicago, from 1889 to 1893, only five were traumatic rupture of the bladder. At the Episcopal Hospital in this city there were treated, from January 1, 1900, to January 1, 1905, 8367 surgical ward-patients; among this number there were thirty-six instances of injury to the abdominal viscera (0.43 per cent. of the whole), while among these thirty-six patients only three suffered from intraperitoneal rupture of the bladder. That is to say, intraperitoneal rupture of the bladder formed 8.33 per cent. of all abdominal injuries, and was met with but once among every 2789 patients. Intraperitoneal rupture is a much more frequent injury, however, than is extraperitoneal rupture, this latter forming only about 10 to 20 per cent. of all cases of rupture of the bladder.

The records of one hundred and ten patients treated by laparotomy have been examined, the original reference having been consulted in every case in which it was accessible to me, and in other cases I have taken pains to indicate the medium of information.†

Out of the whole number of records examined, it appears that sixty-three patients recovered, and forty-seven died, a total mortality of 42.72 per cent.

CAUSES. The causes of rupture of the bladder may be classed as *predisposing* and *exciting*. Among the former the preponderating influence of *sex* is apparent from the fact that, of the one hundred and four patients, whose sex is mentioned, ninety-four, or over 90 per cent., were male, and only ten were female. Mere liability to injury is probably not the only explanation for this marked difference. It has been pointed out by various writers that women are more prone than men to allow their bladders to become overdistended, and some authors have thought that the greater size of the pelvis in women and the lateral, rather than the anteroposterior expansion of the bladder, in the female sex, rendered this organ less liable to rupture, even when distended. So that, even were

* Archiv f. klin. Chir., 1878, xxii., 519, 715.

† There are certain cases included in previous tables, the reports of which it has been impossible to find. These cases—notably Halstrom's patient, quoted from the Lancet of June 28, 1888, and Hitchcock's second patient, quoted from the Pittsburgh Medical Review, 1888, ii. 55—have therefore not been included in my analysis, no trace of such records having been found in the journals referred to.

women exposed to injury as often as men, it is not probable that their bladders would be ruptured with the same frequency. It has been suggested, moreover, that the short urethra of the female may serve as a sort of safety valve, allowing immediate expulsion of urine and collapse of the bladder when this viscus is subjected to sudden compression. It is curious to observe in this connection that in McLaren's first patient, a male, urine spurted from the penis as the cart wheel, which produced the intraperitoneal rupture, passed over the patient's abdomen. Although the death rate was over 72 per cent. among the female patients, and less than 36 per cent. among the male, this difference is more apparent than real. For of the eight deaths among the female patients, only four were in cases of uncomplicated rupture of the bladder, the other four fatalities being met in (1) a child of seven years, who had fallen from a bridge to a passing boat, sustaining a diastasis of the sacro-iliac joint; (2) in a woman of twenty-eight years, who had a fracture of the base of the skull as well as of the pelvis; (3) in a girl of three and a half years, who was injured by a crushing accident, and had also a rupture of the intestine; and (4) in an adult patient, who was violently and repeatedly kicked in the abdomen by her drunken husband, and then thrown out of the window. If, therefore, these exceptional cases were disregarded, the mortality for the two sexes would be less markedly divergent.

In regard to *age*, it is naturally found that young adults—those who are most exposed to trauma of various kinds—form by far the larger proportion. Fifty three patients, or 60 per cent. of the number whose age is recorded, were between twenty and forty years of age. The youngest was a girl of three and a half years, who died, and the oldest were two men of fifty-six years, both of whom recovered (Braun, Gangitano). The mortality rates for various ages may be seen in the appendix, Table IV.

Another predisposing cause of importance is the condition of *intoxication*. Over 72 per cent. of the patients, in whose records this point is mentioned, are reported as being more or less drunk at the time of the injury, and it is a sad fact that in not a few instances in which the patients themselves were sober, they sustained their injuries because of intoxication in someone else (Rose, Zeldowitch). Not only does drunkenness predispose to injury in this way, by making the individuals both quarrelsome and unsteady on their feet, but it increases the amount of urine excreted, and by dulling the sensibilities renders the persons so affected often unconscious that their bladders are overdistended, and may even deprive them, when drunkenness is a long-continued habit, of the power of completely evacuating their bladders. The result of this last state—atony of the bladder—is that, although the patient may have passed his urine within an hour or so of the accident, his bladder may still be quite sufficiently distended to predispose it to rupture when

subjected to sudden injury. Another serious aspect of intoxication in these patients is that they frequently remain unconscious of the gravity of their injury, as in the case of my own patient, and sleep off their drunken state only to awake the next morning with a peritonitis fully developed, which could almost certainly have been prevented by prompt operation.

It is worthy of note that among the patients who were intoxicated at the time of the accident, the mortality was over 43 per cent.; while among the sober it was less than 28 per cent.

Distention of the bladder, apart from drunkenness, is itself an important predisposing cause. Even sober patients, hurrying to a urinal in the dark, have bumped against a post and ruptured their bladders, which would not have been in a condition to be injured had the calls of nature been attended to at an earlier hour.

The exciting causes of this affection are conveniently described as *blows, falls,* and *crushes,* corresponding to the somewhat humorous classification of patients into the quarrelsome, the drunk, and the innocent, originally made by Bartels. I do not find, however, that the cases of injury sustained through falls comprise all the patients who were intoxicated, nor that all the crushes were in patients who were innocent of drink. In sixteen cases the character of the injury is not stated, but it is given as a blow in twenty-nine cases, as a fall in forty-five, and as a crush in twenty. Of patients injured by a blow, 82.35 per cent. were drunk, and the mortality among such cases was 55 per cent; of those injured by a fall, 73.53 per cent. were drunk, and the mortality for these patients was 35 per cent.; while of those patients injured by a crushing force, only 38.46 per cent. were drunk, and the mortality under such circumstances was no more than 26 per cent. These figures, thus combined, show at once the life-saving value of early operation, and the lethal influence of intoxication. In the severest class of injuries—crushes—in which there is frequently some bony injury, and some visible contusion of the soft parts, the patients are hurried in patrol wagon or ambulance to the nearest hospital, and appropriate treatment is instituted with the least possible delay, and in such cases the death rate is considerable lower than in either of the other classes, in which the vulnerating force is often so trivial, or the fall so slight, that the patient walks miles, perhaps, to his home, or even to a hospital, and is there treated by simple catheterization, or not at all, and so fails to secure adequate relief until peritonitis is so far advanced as to make recovery very unlikely.

I have not included in this series any patients in whom the bladder was the seat of what has been called spontaneous rupture. These cases belong, with those due to perforation from ulcers and tumors, in a class by themselves, and cannot justly be considered traumatic ruptures in the strict sense of the term.

Clinical Pathology. The mechanism by which the bladder is ruptured has always been a subject of interest. It can best be discussed after studying the lesions produced by the injury. Of ninety cases in which the *site* of the rent is mentioned, in seventy it is stated to have been in the "dome," "fundus," or upper posterior wall of the bladder; in eight cases it was on the lower portion of the posterior wall, toward the rectum; in nine cases it extended from the dome down to the rectum, and in only three cases was it so far removed from the median line of the body as to be classed as being on the "lateral" wall. Since the peritoneum does not extend far on to the lateral walls, and as these rents were all of them intraperitoneal, it is evident that the term "lateral wall" must be interpreted as meaning the lateral portions of the posterior wall. There were eleven cases in which the rent, besides being intraperitoneal, extended for a short distance on to the extraperitoneal surface of the bladder, most frequently into the space of Retzius, but in a few instances involving the base and neck of the bladder. In three cases there were two rents; one intraperitoneal rupture, and a second, distinct extraperitoneal rent. In no case was there more than one rent situated intraperitoneally.

The *direction* of the rent is also of interest in connection with the mechanism. This matter is noted in fifty-three instances, the rent being in the sagittal plane in twenty-five cases; being irregular or oblique, but still more or less anteroposterior in nineteen cases, and in only nine cases taking a transverse or coronal course.

The *size* of the rent is of interest mainly from the point of view of recovery. In eighty-seven cases the dimensions of the rent in the bladder are given, and they may be classed in the following manner: Five cases, less than half an inch, with no deaths; thirty-six cases, less than two inches, with a mortality of 41.6 per cent.; forty-one cases, less than four inches, with a mortality of 46.3 per cent.; and five cases, where the rent was over four inches in length, the mortality in these cases being 40 per cent.

As pointed out by Dambrin and Papin, who have devoted special attention to the mechanism of these injuries, that portion of the bladder in which ruptures are most frequently found is naturally the weakest part. At the fundus of the bladder the muscular fibres are nearly all more or less anteroposterior in direction, and diverge to become circular around the urachus or to ascend along it. The serous coat of the bladder is the least elastic, and therefore most disposed to split of all its tunics. In consequence of this fact, the peritoneal surface of the bladder gives way more readily, on the application of a compressing force, than does any part of its extraperitoneal surface. Moreover, the fundus of the bladder is practically unsupported by external agencies. Posteriorly and at the sides, the distended bladder is supported by the pelvis—the rectum and the pelvic muscles acting in some sort as buffers; while in the hypo-

gastric region, where the vulnerating force is usually applied, the force itself, and the abdominal muscles, support the bladder, leaving its summit, its naturally weakest part, the only portion practically unsupported. Accordingly, the ruptures take place most frequently in this region, and follow usually the natural anteroposterior course of the muscular fibres of the bladder wall; for the circular fibres are relatively feeble, and are torn transversely much more easily than the strong, longitudinal fibres would be.

When the bladder is only partially distended, and when the vulnerating force is applied from above downward and backward, it seems probable that the posterosuperior aspect of the bladder is well supported, and that the rupture is apt to occur on the extraperitoneal surface, near the obturator or ischiatic foramina, the two areas on the pelvic aspect of the bladder least well supported. The experiments of Berndt* lend support to this theory.

When the original force fractures the pelvis, the rent in the bladder is much more likely to be extraperitoneal than intraperitoneal. Fully three-quarters of cases of ruptured bladder, complicated by a fracture of the pelvis, have been found by various investigators to be extraperitoneal in character. And in the extraperitoneal cases the rent is usually produced by perforation of the bladder by a fragment of bone, or from separation of one of the pelvic joints tearing the bladder open; but in the cases in which an intraperitoneal rent accompanies fracture of the pelvis, it is nearly always evident that if the rupture had not been intraperitoneal, there would have been no rupture at all—in other words, that the bladder rent is produced not by the fracture of the pelvis, but independently of it, by the same original injury which produced the fracture. Among the one hundred and ten cases tabulated there were fourteen instances of fracture of the pelvis, with a mortality of 35.71 per cent.

In at least four instances the theory of "contre-coup," or "general concussion of the body," has been invoked to explain intraperitoneal ruptures of the bladder. In Cusack's† case the patient suffered a general concussion of the body, and there was no clear history of abdominal injury. Kerr's patient fell "all doubled up" on his left hip; Roll's patient fell on the buttocks; and Bayard Holmes' landed on his feet and left hand.

Symptoms. The sensations of the patient are so frequently dulled by his intoxicated condition that much more value can always be placed upon a physical examination. Of all symptoms, abdominal pain is naturally the most frequent, and is nearly as often felt in the epigastric as in the suprapubic region. It is, of course, in no way distinctive of rupture of the bladder. But there are certain symptoms so characteristic that they at once suggest the nature of the injury. The most important of these is at once a symptom and a physical

* Berndt, Archiv f. klin. Chir., 1899, lviii., 815.
† Dublin Hospital Repts., 1818, ii., 312.

sign, and has been graphically described by Rose under the name "*blutige Anurie*"—bloody anuria. The patient is eagerly desirous of passing urine, but is totally unable to do so; he may succeed in expelling a few drops of bloody fluid, but it is not to this that the term bloody anuria properly applies; it is to the anuria which is the usual outcome of catheterization. If a patient, after sustaining some abdominal injury, passes blood in his urine, the only natural inference is that his urinary tract is injured, and the question at once arises whether the urethra, the bladder, or the kidney is the seat of the lesion. The character of the injury will almost always exclude traumatism to the urethra, and the ability to pass urine usually determines that the bladder is not ruptured, and so fixes the kidney as the site of the injury. But this last is not always the case, and many a patient has had his chances of recovery from a rupture of the bladder much impaired, if not entirely lost, merely because the examiner has decided that voluntary urination necessarily excluded rupture of the bladder. Examination of the records of eighty-six patients, in whom the question of spontaneous urination is noted, shows that it was present in nine instances, or nearly 11 per cent., a proportion sufficiently large to make dependence on this symptom alone rather fallacious.

The inability of the patient to stand upright, and his persistent tendency to double up his thighs toward his abdomen, has been considered a symptom particularly characteristic of rupture of the bladder. It does not seem probable, however, that it would be more marked in these cases than in oncoming peritonitis from any other cause; but if the patient is seen immediately after the accident, he is more apt to present such symptoms than those of severe shock, which usually are predominant when the intestines are ruptured, allowing the sudden escape of gas into the peritoneal cavity.

There should be no cases in which diagnosis is delayed until the development of peritonitis, for by physical examination, properly conducted, the question of the existence of a rupture of the bladder can be settled to a certainty almost without exception. The introduction of a catheter in cases of suspected intraperitoneal rupture has been strenuously objected to by certain surgeons, who argue that this is the surest way to produce peritonitis; they assert that normal urine is comparatively harmless to the peritoneum, but that a catheter is sure to carry bacteria into the abdominal cavity, and that an exploratory laparotomy is the best method of making the diagnosis. With these gentlemen I am nowise in accord. It appears to me that their premises are ill-founded, and their conclusions accordingly false. Normal urine may possibly, in moderate quantities, be comparatively harmless to the peritoneum. The experiments of Vincent,* and of Strauss and Tuffier,† are of consider-

* *Vide* Hofmokl, loc. cit., S. 1161.

† *Vide* Dambrin et Papin., Ann. d. Malad. d. Org. Gén.-Urin., 1904, xxii., 641.

able interest in this connection, since they show how long-suffering the peritoneum at times may be. But it should not be forgotten that these experiments were conducted with aseptic urine, which is rarely present in the human being, and is very exceptional in the class of patients composing the usual subjects of intraperitoneal rupture of the bladder. In the average patient the urine is septic, in greater or less degree, and although we know (Ferraton) that the peritoneum can absorb aseptic urine, and that up to the development of peritonitis, urine which is not aseptic may be thus disposed of, yet to make these facts an argument against the use of the catheter in diagnosing rupture of the bladder, appears to me unsurgical in the extreme. With proper care no further contamination of the peritoneum need be feared, and the information gained by catheterization and the accompanying tests, which will be presently discussed, will enable the surgeon to avoid needless laparotomies in an immense number of patients, who would be opened "exploratively" in vain, were the use of the catheter neglected.

It seems to me, then, that in suspected cases of rupture of the bladder, a catheter should be immediately passed, but it should, of course, be done with all aseptic precautions. I think a metal catheter is preferable in skilled hands to a rubber instrument. An intelligent surgeon will make a metal instrument act as an exceedingly long finger, in exploring the urethra and bladder, which cannot be done with a flexible catheter. And while I, of course, condemn jabbing the extremity of the catheter about in the bladder with the intent of thus discovering the rent, there can, I think, be no question as to the advisability of gently turning its point hither and thither, and noting the increase or decrease of the urinary flow as these manœuvres are practised. In at least seven of the recorded cases, the rent was found in this manner. The risk of converting a partial into a complete rent by this method, is much less than that of leaving unsutured a rent involving one or two coats of the bladder only.

If this "catheter test" is not employed, or if it is negative, there remains the test known by Weir's* name, which is scarcely less valuable. This consists in first evacuating all urine possible, then injecting a measured quantity of fluid, and finally in seeking to recover all that was injected. As a rule, when the catheter is first passed, little or no urine is obtained. Of seventy-one cases in which the point is mentioned, absolutely no urine was obtained in three; a very small amount of bloody urine was obtained in sixty-one, and in seven cases clear urine was obtained. This shows the overwhelming importance of Rose's symptom of bloody anuria, but it also demonstrates the fact that when so important a symptom is contradicted by the presence of clear urine in one-tenth of the cases, dependence on symptoms alone will lead the surgeon astray.

* N. Y. Med. Record, 1887, i., 88.

Hence the value of Weir's test, of injecting the bladder after evacuation has been accomplished. Usually, it is recommended that only ten ounces or a pint be injected. This quantity has, however, on numerous occasions proved insufficient. In Deaver's patient, reported in this paper, one pint was injected, and it was all recovered, and this fact was taken to indicate that the bladder was intact. As a consequence, the bladder was not examined until the other organs, which might have been injured, had been found unhurt. It is safer, therefore, to continue injecting fluid with all gentleness, until a quart has been introduced, unless the development of a hypogastric swelling, characteristic of the unruptured bladder, sooner occurs and by its presence excludes the possibility of a solution of continuity of the bladder walls. Weir's test is recorded as having been employed in only sixteen of the reported cases. Undoubtedly it has been employed in many more, but the reporters have not included it in their record. Of these sixteen cases, it was positive in twelve, and negative in four. In the negative instances the rent in the bladder was only about a half inch in length in two cases (Bolton, Hofmokl); in the third (Deaver) only a pint of fluid was used; but in the fourth (Alexander) the rent was four inches in length, and there is no apparent reason why the test should have proved negative. In Walsham's second patient the test was doubtful, and he accordingly injected air into the bladder. This test was positive to an alarming degree; the abdomen at once became tympanitic; the liver dulness, present before, was suddenly obliterated, and the patient went into a "condition closely resembling collapse." In my own patient the injection test may be said to have been doubtful in a certain sense, although no fluid was recovered at the first attempt, since, after freeing the catheter eye of a clot, a larger amount than was injected was finally evacuated. Yet the very fact that more fluid was recovered than was injected was very good evidence that the superfluous quantity came from the peritoneal cavity and not from the bladder.

The cystoscope is naturally nearly valueless in these injuries, since the bladder cannot be satisfactorily distended. Yet Roll made his diagnosis by its means on the fourth day, and had the satisfaction, some weeks later, of viewing by the same means the scar left in the bladder by his successful suturing of the rent. At the operation the rent in the bladder was found feebly stopped by a prolapsing coil of intestine.

The force with which the stream flows from the catheter, and the intermittent exacerbations of force, due to the compressing action of respiration on the abdominal contents, are signs which have been dwelt upon by some authors as particularly significant of fluid draining from the general peritoneal cavity. For my own part, I should attach little value to these characteristics, as I have seen the same features repeatedly when drawing urine from atonic

bladders, in which there was no other expulsive force than that of the abdominal muscles and the diaphragm.

Palpation is of little value, except for the detection of the usual signs of peritonitis. Percussion is much more reliable, and will usually detect not only the distended bladder, if present, but on the application of Weir's test will demonstrate the development of a hypogastric tumor with the characteristics of the bladder if this viscus be still unruptured. The discovery of free fluid within the abdominal cavity, the dulness in each flank disappearing as the patient is rolled to the opposite side, furnishes what is probably as certain proof of the nature of the injury as can be obtained by the ordinary methods of physical examination. The patient might of course be the subject of ascites, or the fluid might be intestinal contents or blood, but as a rule these affections can be ruled out by other symptoms. If the fluid were intestinal contents the shock immediately following the accident would probably have been greater, and the onset of peritonitis would have been correspondingly rapid; while the evidence of internal hemorrhage would in the latter case have probably overshadowed all other symptoms. The absence of movable dulness in the flanks must not, however, be taken to indicate that no urine has escaped from the bladder into the peritoneal cavity. As already remarked, the peritoneum is quite able to absorb a certain amount of urine, and during the first twelve or twenty-four hours may absorb it, if fairly normal in quantity, nearly as rapidly as it is excreted by the kidneys, and hence the urine may not begin to accumulate in the dependent portions of the abdomen until the development of reactive exudation from the peritoneum impairs its absorptive power. This was probably the case in Blumer's patient.

Diagnosis. When the history is clear, and other injuries do not distract the attention of the examiner, the presence of a ruptured bladder need scarcely ever be overlooked. Given a man, drunk, or drinking, who has sustained some abdominal injury, the first organ to be excluded from the category is the bladder. If it be possible to determine that the bladder was full when the accident occurred our suspicions will naturally be re-doubled. The patient may have felt something give way inside him when he was injured. Desire to urinate with inability to do so, usually follows as soon as the first shock of impact and the sudden pain in the belly allows the patient to consider his natural feelings. Passage of a catheter then draws no urine, or, at most, a little bloody fluid. With a clear history these facts alone would warrant a surgeon in resorting at once to laparotomy, and it seems incredible that patient after patient has been catheterized and re-catheterized without drawing urine; has been purged and given all manner of drugs by physicians who are supposed to be able to make a diagnosis of intra-abdominal affections, and that the patient has only as a last resort

been sent to a hospital, or placed under a surgeon's care, with the ready-made diagnosis of intussusception, extrauterine pregnancy, strangulated hernia, or even merely peritonitis!

TREATMENT. There is no question that the proper treatment is to open the belly, suture the rent, evacuate the urinous fluid, and drain the wound until there is nothing left to drain. With this treatment promptly instituted three out of four patients are being saved at the present time. This increase in the rate of recovery, well shown in Table II, can only be maintained or improved by operating as soon after the injury is received as possible. For practically all operations done within a few hours have been within the last five years. Taking all the recorded cases of operation, it is seen that of those patients operated upon within eight hours, and within twelve hours after the accident, the mortality is practically the same—from 33 to 37 per cent. (Table VII). After twelve hours have elapsed the mortality jumps at once to over 50 per cent. The number of patients operated on over thirty-six hours after the injury is fortunately small, and hence does not allow of any very definite conclusions, but merely shows that the few individuals who have enough vital resistance to live that long, without any operation, have more than the surgeon has a right to expect of his patients. The notorious patient of Ledderhose, who survived the immediate results of the injury, and recovered after the opening, on the seventeenth day, of an intraperitoneal abscess in communication with the bladder, got well, as Zeldowitch sententiously remarks, more by good luck than good management.

The incision in the hypogastric region should be amply large to facilitate rapid operating. A number of surgeons advise first opening the space of Retzius, exploring for extraperitoneal rupture, and then opening the bladder, as in suprapubic cystotomy, and examining the interior of this organ for the evidence of a rent. I do not, myself, see that this course presents any advantages, unless in some exceptional case, in which the diagnosis between extraperitoneal and intraperitoneal rupture had not been made before the operation. On the other hand, such a course presents to my mind many obvious disadvantages. It is primarily a pure waste of time. If the rupture is intraperitoneal, it is perfectly needless to view it from within the bladder, whence it could not be satisfactorily sutured; and by opening the bladder through the space of Retzius we will only be adding a second wound to the one already existing. Even if an intraperitoneal rupture be not accessible when the intraperitoneal surface of the bladder is exposed, the surgeon is at least enabled to evacuate the abdominal fluid, and to take measures for excluding the bladder area from the rest of the peritoneal cavity—matters of much importance, but impossible of accomplishment from within the bladder.

If no other injuries demand immediate attention, the surgeon's

first act should be to find the rent in the bladder and suture it. There is no use in cleansing the peritoneal cavity until further soiling of it has been prevented. Degen made the attempt to wipe the abdomen dry before suturing, but abandoned the task, because, as he says, he found it a "Sisyphus Arbeit." Yet it is often necessary to mop a certain amount of fluid out of the pelvis before the bladder can be inspected. For this purpose no method is so convenient and rapid as the use of large marine sponges, which will absorb fluid in much greater quantities than will gauze. The Trendelenburg position facilitates the discovery and suture of the rent, but the use of Peterson's rectal bag (advocated by Weir) is usually needless, and may be harmful. The intestines must be protected and kept out of the way, during the suturing, by means of gauze packs.

The suture material is preferably of silk. It has usually been found quite sufficient to apply a single row of seroserous sutures, reinforcing the first row at one or two points as needed. If the wound is deep, it is best to insert the anterior sutures first, and then to use them as guys in pulling the bladder upward. A long needle holder is a convenience. Care should be taken to approximate closely the posterior extremity of the rent, which is the point most apt to leak. If two layers of sutures cannot be inserted it is best to make the single row interrupted, and of the mattress type, when possible. Such stitches are less apt to tear out, and bring the serous surfaces together more accurately.

Some surgeons have not sutured the rent at all. In eighty-nine instances it was sutured, with a mortality of 38.2 per cent.; and in six cases it was not sutured, with a death rate of 50 per cent. The difference is not so marked as one would expect. In four patients, the rent, though undoubtedly intraperitoneal, could not be found. The mortality in these cases was 50 per cent.

A method of exclusion of the rupture has been advocated by Hellendahl,* and practised by B. Holmes, Föderl, Hildebrand, and Madelung. This plan consists in suturing the edges of the rent in the bladder to the parietal peritoneum of the anterior abdominal wall, thus converting the rupture into an extraperitoneal injury. Drainage of the bladder is then provided through the rupture, which is left open for the purpose, and the peritoneal cavity is separately drained, when necessary, through the upper half of the abdominal wound. This method is not readily applicable to any cases except where the rent is in the dome of the bladder, but B. Holmes and Föderl closed the posterior half of the rupture by sutures, and then stitched the edges of its anterior portion to the parietal peritoneum; while Madelung, in whose patient the serous coat of the bladder was relaxed, as the result of urinary infiltration beneath it, first closed the entire rent with sutures, then laid a strip of iodoform

* Inaug. Dissert., Strasburg, 1896.

gauze over it, and finally sutured the visceral peritoneum covering the bladder to the parietal peritoneum of the anterior abdominal wall, so that the iodoform gauze somewhat resembled the tube employed in Witzel's method of gastrostomy. Both Hildebrand and Madelung had first opened the bladder through the space of Retzius, and therefore used that wound for drainage.

It seems to me that this rather complicated method possesses no advantages whatever over complete closure of the intraperitoneal rent in the uusal way, except it were in a patient with impermeable stricture of the urethra, in whom no other outlet for the urine existed. Lyot employed a somewhat similar procedure in such a patient, with perfect success. Extraperitoneal wounds of the bladder into the space of Retzius should always be left unsutured, at least in part, since firm adhesion of muscular tissues does not occur promptly enough to prevent leakage of urine from the bladder, and the establishment of at least a temporary urinary fistula. Intraperitoneal wounds, on the contrary, heal with sufficient firmness in so short a time as to justify one in not anticipating leakage. Of the four patients treated by Hellendahl's method, B. Holmes' was the only one that died.

When the intraperitoneal rent can be securely closed, there is, therefore, no need to drain the bladder suprapubically. Injection of the bladder to test the security of the sutures is not advisible.

As soon as the tear in the bladder has been disposed of, the surgeon must devote his attention to the removal of the urine from the general peritoneal cavity. I have already expressed my opinion as to allowing this fluid to remain indefinitely, with the idea that the peritoneum will absorb it. One success, such as in Schramm's patient, by no means justifies us in such a course. As the urine is usually widely dispersed in the abdomen, filling the flanks as well as the pelvis, it can be most quickly evacuated by irrigation, which should be prolonged until the fluid returns clear, and is free from urinous odor. Mopping several quarts of fluid out of the abdomen is a tedious matter, as anyone may know who tries it (experiments are best made on the cadaver), and the repeated insertion and withdrawal of gauze sponges cannot fail seriously to abrade the serous lining of the abdomen. I say this in spite of the fact that my investigations show that among forty patients, treated by irrigation, the mortality was 40 per cent., while among twenty-five, treated merely by wiping, the mortality was only 28 per cent. The difference, as further analysis of the cases shows, consists in the fact that when wiping alone was employed the urine was mostly confined to the pelvis; whereas, in a majority of the patients irrigated, urine, blood clots, and even pus, were present in the kidney pouches, and in some instances around the stomach and liver, as well as in the pelvis.

It is safer to drain the peritoneal cavity by a tube reaching to the

rectovesical pouch. By placing the patient in the semi-sitting posture, the retained fluids or any exudation from the peritoneum will thus gravitate to the pelvis, and may be withdrawn through the tube at suitable intervals. It is noted in the case records that fifty-three patients were treated by drainage of the peritoneum, with a resulting mortality of 32 per cent.; while among thirty-nine patients, whose peritoneal cavities were closed without drainage, the mortality was nearly 36 per cent. The difference according to figures is, therefore, of little moment, but it is to be explained, as in the instance cited above, by the fact that the more severe the peritoneal infection, the more apt a surgeon is to drain; that is to say, by means of carefully instituted drainage the mortality of the severe cases has been rendered about the same, in the aggregate, as that of the mild cases. In any case when the integrity of the suture line is doubtful, it is well to protect the intestines from the bladder and the drainage tube by a strip of gauze.

It is also, I think, worthy of notice that among nineteen patients whose bladders were drained suprapubically, either by means of Hellendahl's method, or through a suprapubic cystotomy incision, there were only three deaths—a mortality of 15.78 per cent. These figures, together with the fact that of the twelve patients who developed suprapubic urinary fistula after the operation *not one* died, seem to show beyond doubt that free and constant drainage of the bladder is imperative. As I have remarked before, an intraperitoneal rent can usually be so securely sutured that leakage need not be feared, and the bladder can then be drained by an inlying catheter introduced through the urethra. If the intraperitoneal rent, therefore, cannot be securely sutured, or if there be an extraperitoneal opening, it would seem wisest to provide for suprapubic drainage of the bladder, which has been demonstrated on many occasions to be much more free and complete than perineal drainage or that obtained by an inlying catheter.

If an inlying catheter cannot be tolerated by the patient, he should be catheterized every three or four hours during the first few days; and if even this course produces undesirable pain or inflammation, a urinal should be taken to him every two hours and he should be made to urinate day and night with unfailing regularity, but less often, after the first day or two, until recovery is assured.

Statistical Summary.

Table I.

Recovered	63
Died	47
Total	110

Mortality, 42.72 per cent.

TABLE II.

Date.	Operations.	R.	D.	Mortality per cent.
1860–69	1	1	0	00.00
1870–79	2	0	2	100.00
1880–89	24	9	15	62.50
1890–99	35	16	19	54.28
1900–1905	48	37	11	22.91
1860–1905	110	63	47	42.72

TABLE III.

Sex.	R.	D.	Total.	Mortality per cent.
Male	60	33	93	35.48
Female	3	8	11	72.72

(In 6 cases the sex is not recorded)

TABLE IV.

Age.	R.	D.	Total.	Mortality
Less than 5 years.	2	1	3	33.33
5 to 10 "	2	1	3	33.33
10 to 20 "	3	0	3	00.00
20 to 30 "	17	7	24	29.16
30 to 40 "	17	12	29	41.37
40 to 50 "	14	7	21	33.33
50 to 60 "	3	3	6	50.00

Age.	Cases.	Deaths.	Mortality per cent.
Less than 20 years.	9	2	22.22
20 to 40 "	53	19	35.84
40 to 60 "	27	10	37.00

(In 21 cases the age is not recorded)

TABLE V.

Character of injury.	R.	D.	Total.	Mortality per cent.
Blow	13	16	29	55.17
Fall	29	16	45	35.55
	14	6	20	26.31

(In 16 cases the character of the injury is not stated)

TABLE VI.

	R.	D.	Total.	Mortality per cent.
Intoxicated	31	24	55	43.64
Sober.	16	6	22	27.27

(In 33 cases soberness or drunkenness not mentioned)

TABLE VII.

Time between injury and operation.	R.	D.	Total.	Mortality per cent.
Less than 8 hours	10	6	16	37.49
Less than 12 "	10	5	15	33.33
Less than 24 "	16	17	33	51.50
Less than 36 "	3	3	6	50.00
Less than 48 "	7	2	9	22.00
Third day or later	13	6	19	31.57

(In 12 cases the time between injury and operation is not given)

TABLE VIII.

Size of rent in bladder.	R.	D.	Total.	Mortality per cent.
One-half inch or under .	5	0	5	00.00
Two inches or under .	21	15	36	41.66
Four inches or under .	22	19	41	46.34
Over four inches. . .	3	2	5	40.00

(In 23 cases the size of the rent in bladder is not given)

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N. B.—Since going to press Marnoch (Annals of Surgery, 1906, i. 241) has recorded a successful laparotomy for intraperitoneal rupture of the bladder.

EXPERIMENTS ON THE GREAT OMENTUM.

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The Great Omentum. It is an undoubted fact that the great omentum plays a very important part in the bacteriology of peritonitis, but of still more importance is its relation to cellular pathology.

To Herbert Durham[1] is due the credit of first drawing attention to these facts. It is surprising, therefore, that so little notice should have been paid to the functions of this portion of the peritoneum when we consider the importance of Dr. Durham's valuable paper.

Bacteriology of the Great Omentum. The important part which the omentum plays in peritonitis, if we can judge from surgical text-books, has almost escaped notice.

Klein has remarked that the omentum is intensely injected in guinea-pigs dead from peritonitis, and may sometimes show petechial hemorrhages. This condition, as Durham has already noticed, is a constant feature of peritonitis in both man and animals. In guinea-pigs dead from peritonitis we always find the omentum rolled up toward the diaphragm; this feature of the great omentum may often be observed a few hours after an intraperitoneal injection of a pathogenic organism. The cause of this rolling up is due, as Durham has stated, to the peristaltic movements of the intestines.

The term "chemical peritonitis" introduced by Tavel and Lanz, has now been shown to be incorrect, owing to the researches recently made by Dudgeon and Sargent[2] on the bacteriology of peritonitis.

[1] The Mechanism of Reaction to Peritoneal Infection, Journ. Path. and Bact., 1896 and 1897, vol. iv.
[2] The Bacteriology of Peritonitis. Constable, London, 1905.

These observers have shown that the so-called chemical peritonitis is really a peritonitis due to the staphylococcus albus. They have also found that the staphylococcus albus and other micro-organisms may be found on the surface of the omentum, although the peritoneal exudate may have been sterile.

The importance of these facts is overwhelming. It proves beyond question that the omentum should be examined in every case of peritonitis, and in every animal experiment, and that the examination of the peritoneal exudate alone may be of little value. Durham questioned the accuracy of the term "chemical peritonitis" in his classical monograph on peritoneal infection to which we have already referred. He states: "Pieces of omentum will sometimes show both microscopically and in culture that microbes are present, whilst the fluid of the peritoneum is sterile. These remarks apply to the peritonitis of man and that produced experimentally in animals." In conclusion, Durham adds: "These facts make one chary of accepting the 'chemical (aseptic)' peritonitis of Tavel and Lanz as well authenticated, in the absence of more thorough evidence."

Our own investigations on the bacteriology of the great omentum in both man and animals are of interest, and are referred to elsewhere in this communication; but suffice it to state here that (1) the normal omentum is not always found to be sterile, since in large numbers of instances the white staphylococcus can be cultivated when pieces of this tissue are dropped into broth; (2) the peritoneal exudate will be found to be sterile after the injection of sterile chalk or sterile normal saline into the peritoneal cavity of animals, while the white coccus can be obtained from the omentum in many instances in the same animals whose peritoneal exudate has been found to be sterile.[1]

In conclusion, it will be convenient here to again draw attention to one of our experiments in which we had injected the bacillus aerogenes capsulatus into the peritoneal cavity of a guinea-pig.

The animal was killed at the end of twenty-four hours from the time of inoculation and film preparations were made from the peritoneal exudate and from the great omentum.

A differential count of 500 cells present in the peritoneal exudate showed 451, or 90.2 per cent., of finely granular polynuclear cells, *but none contained micro-organisms*, while from the great omentum 489, or 99.6 per cent., were present, and *every cell was phagocytic*. This experiment and many others confirms if it were necessary, the value of the examination of the great omentum in every case of peritonitis, as Durham originally pointed out.

Cytology. The intensely active phagocytes described by Metschnikoff[2] as the macrophages are derived from the endothelial

[1] Phagocytos, Trans. Path. Soc., London, 1906, and Lancet, October 21, 1905.
[2] La Theorie des Alexocytes, Ann. de l'Institut Pasteur, 1893, vii.

cells of the great omentum and also from other situations. During the macrophage stage, Durham has observed the large cells of the omentum to be amœboid. Foci of multinuclear and binuclear cells occur, from which cells having all the appearances of the free macrophages are budded off. The large hyaline cell met with in the blood is also of this class, and many other mononuclear cells. These cells Metschnikoff and others have shown to play an important part in peritonitis after the first sixteen hours. Durham has found large numbers of these cells in the great omentum englobing micro-organisms and also microphages. Numerous observers have stated that from five to six minutes up to and including one hour after an intraperitoneal injection the peritoneal fluid becomes almost cell free. This leukopenic stage has generally been considered by Metschnikoff and others to be due to the fact that the cells are dissolved. Durham has shown, however, that the cells which, as we know, have a strong tendency to clump are gathered together on the great omentum. The only cells which are found during this period in the peritoneal exudate, according to these authorities, are the small lymphocytes which, as Durham has shown, do not form part of the clumps present in the peritoneal fluid during this stage, and, therefore, are much less readily attracted toward the great omentum.

Our results differ in many points very considerably from the observations of most of the previous workers on this subject. We have found that the mononuclear cells are generally most numerous in the peritoneal exudate at the end of the first quarter of an hour after inoculation, but we have also noted that the fluid in the peritoneum is often abundant and the cells likewise, while in many instances cells other than the small mononuclears are plentiful in the exudate at this period.

In some cases, however, the coarsely granular eosinophile was found to be the chief cell, in other instances the large mononuclear. In every instance, the clumping of the cells was obvious at this period, the clumps were both small and large, but generally small, while the lymphocytes were usually free, as Durham has shown. In one instance, the peritoneal exudate of an animal was examined half an hour after inoculation, in which case the endothelial cell formed no less than 86.2 per cent., and 145 out of 500 were found to be phagocytic. It is, of course, impossible to derive any exact observations from the results of a solitary experiment. If, however, we refer to the one-hour cases, we shall find that in most instances the finely granular polynuclear cell formed the chief variety of leukocyte at this stage. Durham considers that the leukopenic period actually terminates with the appearance of these cells. He adds, however, that for some time after the arrival of the microcyte the fluid remains leukopenic. With

this remark we cannot agree, as will be shown by referring to the tables which are given below.

PERITONEAL EXUDATE EXAMINED AT THE END OF FIFTEEN MINUTES.

No. of observations.	Amount of peritoneal fluid.	Nature and number of cells.
14	Large . . . 9 cases	Cells abundant in 9 instances; in small number in 5 cases. The small mononuclear cells amounted to over 90 per cent. in 8 examples. In the remaining instances, in four examples the coarsely granular eosinophiles formed the large majority of the cells, and in two cases the endothelial cell was the most common variety. In both of the last-mentioned instances the peritoneal exudate was obtained from rabbits.
	Fair . . . 2 cases	
	Small . . . 2 cases	
	None in one case	

PERITONEAL EXUDATE EXAMINED AT THE END OF ONE HOUR.

14	In 8 cases the cells were numerous, in the remaining instances scarce. In 9 examples the finely granular polynuclear cells amounted to over 50 per cent., in one case to 97.2 per cent. In the remaining 5 instances, they were either equal to or less than one of the other varieties of leukocytes.

EXPERIMENTS ON THE OMENTUM. In connection with their work on the bacteriology of peritonitis, Dudgeon and Sargent have noted the fact that in every class of case the staphylococcus albus is the first organism to appear in the peritoneal cavity, and that organisms are frequently found on the surface of the gut but not always in the exudate.

We were thus induced to undertake the following short series of experiments in the hope that they might lead to additional information as to the part played by the omentum in peritoneal phagocytosis.

Every precaution was taken in procuring the specimens of omentum to avoid contamination from all possible sources.

The first series of six guinea-pigs were all examples of healthy animals. In three instances an abundant growth of the white coccus was obtained from the omentum, in one a slighter but quite definite growth, while the remaining two cases proved to be sterile. In every animal of this series the peritoneal exudate was sterile.

The second group of animals all received an intraperitoneal injection of a sterile solution of normal saline, with the result that the staphylococcus albus was grown from the omentum in all three cases (after two, four, and eight hours) and again in every instance the peritoneal fluid was sterile.

The final series of guinea-pigs were similarly inoculated with sterilized chalk in normal saline. Here the white coccus was grown from the omentum not only after two, four, and eight hours, but also at the end of twenty-four hours (in three examples

out of four). In every instance the peritoneal exudate proved to be sterile, thus giving in this respect a uniform result throughout this research.

It is hardly necessary to add that the materials used for inoculation were proved sterile by cultural tests.

The conclusions warranted by these experiments appear to be:

(*a*) The staphylococcus albus is often present as a normal inhabitant of the omentum.

(*b*) When non-bacteriological substances are injected into the peritoneal cavity of animals the staphylococcus albus can usually be recovered from the great omentum.

One of us has cultivated the same white coccus from the omentum in many cases in which the peritoneum was opened, apart from peritonitis. In all these cases the pieces of omentum were dropped into culture tubes of broth and the growth investigated in the usual way.

SAUERBRUCH'S OPERATIVE CHAMBER: HISTORY, EXPERIMENTS, AND EXPERIENCES.[1]

By Bernhard Hahn, M.D.,

of Tacoma, Washington,

late assistant to prof. v. mikulicz, of breslau, germany.

This paper may serve as a slight tribute to the genius of the late Professor v. Mikulicz, a man who was more popular in this country than any other foreign surgeon and who, perhaps, felt more sympathy for America than any other ever did. The invention in which I wish to awaken your interest is the last of those great boons to humanity which came from the Mikulicz clinic and which have made that clinic famous far beyond the German frontier.

The close relations I maintain with Sauerbruch, my thorough acquaintance with the history and development of his invention, which I followed as an eye witness, and finally the fact that I assisted Professor v. Mikulicz in his operations on men in the chamber, may explain why I feel qualified to write on this subject.

The method is one of performing operations within the thoracic cavity. As I had the good fortune to witness the progress of the work from beginning to end, and had some personal part in it, too, I will endeavor to give an historical picture, without entering into details or scientific argument.

In October, 1903, I was present when my late chief, Professor v. Mikulicz, of Breslau, gave to one of the youngest externes of his

[1] Read before the County Medical Society at Tacoma, Washington, October, 1905.

clinic this suggestion, to find a way of avoiding pneumothorax, during intrathoracic operations—a problem which naturally was very dear to a surgeon like v. Mikulicz, who had done so much for the development of abdominal surgery and whose ambition naturally strove to overcome the obstacle, which until now had prevented a similar development of thoracic surgery. Perhaps Sauerbruch was especially well fitted for this work as his former scientific training gave him a knowledge of physical laws. In fact, we his colleagues, soon learned of the beginning and progress of his labor and after the first surprising successes in experiments on animals, this subject formed the topic of our daily conversation.

I do not need to mention here that the respiratory work of the lung is done by two functions: namely, the active work of the thoracic muscles and the natural elasticity of the lung parenchyma. The equilibrium of these two functions is guaranteed only so long as the pleural cavity remains closed and air-tight. The moment this is no longer the case, the elasticity of the lung will preponderate, the lung will collapse and we have a pneumothorax with all its dangerous sequelæ. A simple consideration must tell us that a pneumothorax would be preventable if it were possible either to produce within the lung an increase of pressure, or to decrease the atmospheric pressure upon the lung from without. Sauerbruch chose the second method. After some other experiments which were quickly abandoned, he came to the idea of inclosing the field of operation; that is to say, the thorax, in a kind of box which represents a vacuum, or more correctly, that contains rarefied air, so as to produce an increase of air pressure from within, which prevents the lung from collapsing after the opening of the pleural cavity. It was evident that operating under such conditions would be most difficult and it was but a step to the idea of placing the whole animal, with the exception of the head, into an experimental cabinet in which there was a pressure lower than the atmospheric. A simple idea, a veritable egg of Columbus, only no one had until then thought of setting it upon its point.

The cabinet first constructed was a cube with wooden walls which were lined with tin and which was as air-tight as possible. This furnished a space of two cubic metres, which was just sufficient to hold an operating table and two men. In one wall there was a round opening which was closed off by means of a rubber septum perforated in the middle. On the opposite wall was a door through which one could enter or leave the room A cylinder was fitted into the third wall, standing in communication with an electromotor, by means of which the air was pumped out of the room. It was at all times possible to note the rarefaction of air by means of a mercury manometer and to control it by a valve.

The animal used for the experiment (dogs being used almost exclusively) was placed on the table, its head forced through the

above mentioned opening in the rubber septum and was thus placed outside of the cavity, so that it breathed under natural atmospheric pressure. The narcosis was given under the same condition.

It was indeed a spectacle for me, which I cannot easily forget, when in January, 1903, I assisted at one of these operations for the first time. The operation was already in full progress and could easily be observed through the glass ceiling of the chamber. Sauerbruch with an assistant was in this most primitive box in which the operators could scarcely stand upright. After the resection of the sternal portion of a great number of ribs both lungs lay bare. The pericardium also was laid bare and through an incision in this latter the heart was in view. Each one of these organs was carrying out its physiological function before the very eyes of the observers. The heart made its rhythmical contractions, the lungs their inspiratory and expiratory movements, at the same time expanding wonderfully. My astonishment increased when I beheld Sauerbruch removing all the ribs up to within a short distance of the vertebral column, without interfering in the least with the respiration. Like so many interesting phenomena in the realm of physiology, this surprising fact has been given to us through Sauerbruch's work, namely, that the active work of the thorax to which the action of the lung is bound, is sufficiently kept up if only half of the diaphragm and some insignificant remnants of ribs with the most necessary muscular attachment remain. I should like to ask here whether we are not justified in interpreting this surprising phenomenon much more in this way, that the lung itself takes an active part in the inspiratory expansion, a possibility which, as you know, has been denied until now.

During the first month of 1904 Sauerbruch operated on from seventy to eighty dogs by this method, a great number of which survived for a longer or shorter time after those very serious surgical operations upon the lungs, the mediastinum, the heart, and the œsophagus. A considerable number have remained alive. A number of the others died from infection, which as you understand can scarcely be avoided in dogs. Frequently aseptic and careful operating was not even attempted.

The method had advanced to this point when Sauerbruch and v. Mikulicz presented it to the Surgical Congress in Berlin. Up to this point also the first publications go, which you will find with all their technical details and physiological discussions in Sauerbruch's and v. Mikulicz's articles.[1]

The results obtained until then were so encouraging that a man like v. Mikulicz had a right to dare to attempt the operation on man;

[1] Zentralb. f. Chirurgie, 1903 and 1904; Verhandl. der Deutsch. Gesellsch. f. Chir., 1904, and especially in the Mitteil. aus den Grenzgeb., 1904, Heft 3.

the more so as it almost always concerned cases otherwise incurable and fatal, or localities which until now had been inaccessible to the knife of the surgeon.

Professor v. Mikulicz, who had followed the entire development of the method with lively interest, now had a cabinet built in his clinic on a grand scale, which not only cost a great deal of money, but also produced many technical difficulties. This chamber has the shape of a cube and contains forty cubic metres of space. Floor and ceiling, as well as the four walls up to about one metre in height, consist of strong iron, the rest of the walls of very strong glass. The whole thing is constructed absolutely air-tight, as well as the double door which is held tightly closed by means of an iron beam pressing against a thick rubber incasement. Opposite this there is exactly, as in the original dog chamber, on a level with the operating table, a circular hole which is closed by a rubber septum. The hole, again, has a circular opening through which the head of the patient can be forced without difficulty, whereupon the septum spontaneously closes around the neck like a cuff. A third wall bears the evacuating apparatus consisting of a suction pump which is driven by a one-horse power electromotor and which has a suction power of three hundred litres per hour. Next to it there is a valve which permits the renewal of air within and regulates the rarefaction of air with respect to the air pressure. All this is managed inside of the cabinet. In case the electromotor should accidentally stop working there is a hand pump in reserve. A negative pressure of ten millimetres of mercury proves to be sufficient to guarantee the expansion of the lung. As far as I can remember, the air pressure was approximately fifteen millimetres below the atmospheric pressure.[1] The entire chamber, therefore, corresponds quite closely with the little experimental cabinet and only in one respect does it differ essentially. Since the atmospheric pressure upon the entire venous system is increased in this chamber the venous circulation would naturally go on considerably slower, the aspiratory work of the pleural cavity would be much diminished, and in this way more work would be exacted of the left ventricle. This obstacle is overcome by placing the whole body of the patient, from the ribs down, into a rubber sac which communicates with the outer air, thereby keeping out the influence of the pneumatic cabinet and placing the venous system under the ordinary atmospheric pressure. But this sac was not used in connection with all our operations. The cabinet is lighted by an electric arc light fastened to the ceiling; a transportable incandescent light is also at hand.

Let us now proceed with the operation: The patient, not yet fully anæsthetized (chloroform being preferable to ether), is brought into the cabinet and placed upon the table, his head, forced through

[1] The operations are now performed at a pressure of —6 to —12 mm.

the rubber cuff, rests outside upon a small table, beside which the anæsthetist has his seat. The door of the cabinet is closed and the apparatus set in motion. There is just room for the operator, two assistants, one man who handles the instruments and another who attends to all the mechanical apparatus. Besides that there is room for two small tables on hinges on which the instruments, the dressings, and the irrigating fluids are placed. As soon as the manometer shows an air pressure of minus twelve to fifteen millimetres the operation begins.

By this time it is likely that various doubts have arisen in your minds. You will ask, Is not the anæsthetic most difficult under such conditions? Well, taking for granted that we have a conscientious and capable anæsthetist the narcosis can be carried out in the usual way and I cannot say that we had any more accidents in the cabinet than under ordinary conditions. The anæsthetist, as well as the operator, can watch the pulse. One need not fear the compression of the neck and its vessels by means of the rubber cuff, although the latter substance clings very tightly under the atmospheric pressure. Besides being able to use a sign language the operator and anæsthetist are in communication by means of a telephone. Nevertheless, it must be admitted that in cases of immediate danger, such as asphyxia, etc., it is somewhat more difficult to employ energetic measures than under ordinary conditions. The body of the patient is, as one might say, divided into two parts; the anæsthetist who is outside cannot come near the trunk and those inside the cabinet cannot reach the head. Possibly you will wonder how the operator fares within this cabinet. Well, I have myself operated for hours with Professor v. Mikulicz in this chamber and I can assure you that I felt quite well. To be sure the activity of the sudoriferous glands is increased, but operating in our cabinet is no worse than in the tropical heat of an operating-room facing the south and exposed to the rays of a noonday sun. Sauerbruch calculated that in the cabinet with a negative pressure of ten millimetres of mercury one lives under the same atmospheric pressure as on a mountain of three hundred metres. This certainly does not indicate any marked difficulty in breathing.

I am afraid that I have already gone too far into detail in the introductory part and in the consideration of the technicalities of the method, and now turn to that which will interest you most, the results we obtained in our operations on man. I judge the number of the operations performed in the cabinet during the months of May, June, and July was at least a dozen. I regret that I cannot give any reliable statistics, since at this moment I have no data at hand, so I must depend entirely upon my memory.[1] Moreover, as an assistant of the private clinic, it was not possible for me to follow closely those patients which were operated upon at the University

[1] I am now able to furnish exact data: There were 5 operations on the œsophagus, 1 on the heart, 8 on the lungs, 2 on the thorax.

clinic. Among these, there were operations upon the lung, the œsophagus, the heart, and the thorax itself. First I will speak about the œsophageal cases, as in the entire undertaking v. Mikulicz had the œsophagus principally in mind and it was just in this direction that he had placed his hopes on the new method. The œsophagus lies so hidden and covered by vital organs that the gaining of an entrance is of itself difficult and venturesome. After all attempts at preventing a pneumothorax from the front proved in vain the attempt was made to accomplish this from the back. Although in individual cases, in experiments upon animals, one succeeded in preventing the opening of the pleural cavity, this way also soon proved inadequate. Before all else v. Mikulicz intended to attack this inaccessible region with the help of the pneumatic cabinet, but it was just this part of the work which did not turn out encouragingly. To be sure, on dogs, we succeeded in resecting a couple of inches of the œsophagus and in uniting the ends, and even if the animals finally died it was for the most part due to the fact that it was impossible to keep them properly quiet and to nourish them through a stomach fistula. Since this annoyance can usually be avoided in a human patient one had a right to expect that in man results would be better. Alas, we encountered here other great hindrances. Among these in the first place was the shock, which was produced by displacement of the lung or occasionally of the heart, and by operating at such a depth; it was so enormous at times that threatening phenomena appeared and the operation had to be stopped. Or a carcinoma proved inoperable after laying the œsophagus bare. A few times it resulted in infection and empyema.

A woman who had carcinoma of the œsophagus was put under my special care and I followed the course of the treatment with special attention. In this patient we had previously established a stomach fistula which had improved her nutrition essentially. She was only thirty-eight years old and the œsophagoscope, which in our clinic was used in every œsophageal case, showed a small, circumscribed tumor, which after an exploratory excision with the help of the œsophagoscope, proved, microscopically, to be an epithelioma. The case seemed to be particularly favorable for an operation and yet it was the one which of all our cases ended in the saddest way. Soon after the opening of the pleural cavity and the displacement of the lung, the patient became dyspnœic and pulseless, and succumbed soon afterward. Whether this is to be attributed to the narcosis or shock I do not dare to say. The case was a mystery to us all. We used in this instance preoperative injections of nuclein to produce a hyperleukocytosis to combat, if possible, peritoneal infection. These injections were used in all our cases in which the digestive tract was operated upon. It may be that this had something to do with the causation of death. The woman showed a very bad reaction even before the anæsthetic was started. There was some fever

and a pulse frequency of 176. In short this unfortunate event was never cleared up.

Two other cases of œsophageal carcinoma were operated upon. After exposing the tumors they were found to be inoperable. Both of these patients died from pleurisy. The danger of infection is always great, as the pleura is much more vulnerable to infection than is the peritoneum.

I should like to describe to you here a little more in detail the v. Mikulicz method of operating, in order to make it clear to you that these operations upon the œsophagus must necessarily always produce a severe shock. We must give up trying to build a large thoracic flap in order to have an easy way to get at the œsophagus, since this would render an air-tight after-union impossible, or at any rate very tedious. So we perform the simple thoracocentesis in the fourth intracostal space through an extensive parallel incision. The wound is then forced into a wide gap by forcibly tearing the ribs apart by means of an automatic retractor which is constructed like the one used for tracheotomy, only being much larger and stronger. This act, which frequently requires considerable strength, as well as the separation of the lungs, is especially apt to produce severe shock. In fact, the resection of a rib or two is sometimes safer and may be preferable to that violent procedure. The remaining instruments are the same as are generally used at the clinic, only the scissors, forceps, needle holders, etc., must be considerably longer. Manipulating them must also be learned. Hence as long as I was connected with the clinic the results of our œsophageal operations were not satisfactory.

Furthermore, several cases of gangrene of the lung were operated on, as far as I know with good results. I know you will say "gangrene of the lungs has been operated upon with good results long ago." To be sure, not only that, but there has even existed an established surgery of the lungs, which was developed into its modern form and with its special technique by Quincke, of Kiel. I know from my assistantship in Hamburg-Eppendorf that Lenhartz got very good surgical results in his work on gangrene of the lungs without the aid of the pneumatic cabinets. These, however, were only very lucky cases, so-called show cases, which had been especially selected. He decided to operate only when there were, in all probability, pleuritic adhesions and when the location of the lung focus could be previously determined with comparative certainty. Everyone knows how difficult this is at times, but to search for the focus during the operation was, candidly speaking, impossible. In the pneumatic chamber, however, this could be done with complete composure. A good result was achieved in a case of bronchial fistula.

I also witnessed an operation upon the heart which was performed by one of v. Mikulicz's assistants. It was a stab wound. The man was brought into the chamber in a collapsed condition, but with a

fairly good pulse. After resecting two or three ribs the pleural cavity was opened. The lungs expanded beautifully and after dissecting several layers of tissue the operator thought that the heart, covered with blood clots, lay before him, while in fact it was only the pericardium. The whole appearance of the heart had been changed to a great extent by the fluid infiltration and suggillation. This unfortunate mistake was fatal to the patient. Without it we would have found the wound of the heart more quickly and could have sutured it and possibly saved the patient. Finally, after opening the pericardial cavity and removing the large amount of coagulated blood which filled it, and when the stab wound of the heart muscle was in plain sight, the patient had already bled to death. As you will see, the technique of operating upon the heart and pericardium, also, is modified by the use of the pneumatic chamber, since the discussion about the best and least dangerous point of entrance to the heart is of no importance at the moment when one no longer has to fear the opening of the pleural cavity. We have forerunners in this field of activity also. I recall Rehn's bold deed, Pagenstecher and others, but this field, like surgery of the lungs, has remained very sterile until now.

Finally, I can report a case of surgery of the thorax in which I assisted Professor v. Mikulicz. It was a sarcoma of the thorax the size of an apple, surrounding the third rib and situated above the nipple. The tumor was resected together with a portion of rib the length of a finger. Again the lung expanded beautifully. It took some time to control the bleeding. The thoracic wound was then closed by suturing the anterior costal and pectoral muscle with strong catgut and by exact union of the skin. The whole operation was done without hurry and without the least disturbance. Pulse and respiration of the patient continued good during the whole time. In spite of the fact that because of the considerable loss of blood and our customary normal salt solution irrigations some fluid had collected in the pleural cavity, so that I noticed a hydrohematothorax the next day. In spite of this the recovery was perfect; the patient was discharged on the ninth day and soon afterward sent to her Russian home.

By microscopic examination I was able to determine a mixed-celled sarcoma.

An extensive carcinoma of the breast which had grown into the thoracic wall was operated upon with perfect result. A large skin-muscle-flap was set upon the expanded lung.

If I may be allowed to return once more to the subject of œsophageal operations I would say that the cause of our meagre results does not lie in the inefficacy of the cabinet, but rather in the technical difficulties which under all circumstances go hand-in-hand with operations for carcinoma of the œsophagus.

These difficulties are caused: first, by the location of the organ;

second, by its anatomical condition; and third, by the imminent danger of an infection of the pleural cavity.

First. The operation is performed at a great depth, the operator struggling with the lungs, which are constantly pressing forward and which can be kept back only with much difficulty by means of broad depressors or retractors. Care must be taken not to injure the vagus nerves. The aorta and its numerous branches lie dangerously near. If we are fortunate to succeed in resecting the diseased piece of the œsophagus, we have yet the more difficult task of reuniting the latter. In the first place the œsophagus is not at all movable, since it is just long enough to go the shortest way from the stomach to the mouth. Furthermore, it is tightly adherent to a broad support by means of strong connective tissues. Thus the suture naturally suffers a dangerous tension.

Regarding the frequently occurring carcinoma of the cardiac end, the difficulty can be eliminated by a technical manœuvre, which v. Mikulicz first applied with success in his experiments upon the dog and which he has transferred upon the human body in his experiments upon the cadaver. The cardiac end of the stomach can be pulled up directly through the œsophageal opening in the diaphragm and in this way it can be united with the proximal segment of the œsophagus. Notwithstanding this fact it is, however, difficult to secure a safe union, because in this position it is unfortunately not possible to cover the line of suture throughout with serous membrane, after the manner which is employed so advantageously in intestinal suture, because the œsophagus is only partially covered with pleural tissue, which, moreover, is movable only to a slight extent. On this account it is scarcely to be expected that an œsophageal suture will ever be as safe as an intestinal suture. For this reason it is necessary to make use of drainage, which in turn threatens an infection of the pleural cavity. In order to prevent the formation of a pneumothorax because of the presence of drainage after the completion of the operation, we have constructed a contrivance out of rubber which makes an air-tight closure over the dressing covering the thorax. I will show further on how Sauerbruch, in his latest experiments, has overcome these difficulties.

It does not seem to me that this report about clinical experience is entirely discouraging. It is to be expected that further improvements will be made in the construction of the cabinet. Dr. Gaylord, of Buffalo, New York, has written me that he has constructed a cabinet. It is quite possible that he has already improved upon the original. Others are built in Paris, Berlin, Leipsic, Cologne, Greifswald, New York. Professor Tuffier, of Paris, has taken a special interest in the work. He has experimented on a large scale, and expressed himself in favor of the method.

At this point it is proper to refer to a recent method which may possibly take the place of Sauerbruch's cabinet, and which undoubtedly

has the advantage of greater simplicity. In the beginning of my paper I touched upon the possibility of reaching the same end by another route: namely, by producing an increased pressure within the bronchi, due to the physical difference between bronchial and pleural pressure. This is the so-called "Uberdruckverfahren." This method was studied by Brauer and Peterson, of Heidelberg, during 1904 and following Sauerbruch's work. Many years before this, however, similar apparatus had been employed. The French surgeons, Tuffier and Hallion, and also your countrymen, O'Dwyer and Matas, have made very interesting and valuable experiments in this direction. Their experiments consist essentially in inflation of the lungs by means of bellows, as you understand, in a kind of artificial respiration, but they did not attain a practical result as the methods were insufficient. An improvement was invented by Matas, which consisted in the use of a graduated air pump. This, method has as yet not been applied practically to a great extent. Brauer was the first one to work out this "Uberdruckverfahren" in a practical way. He developed a method in which he made use of a small cabinet with positive air pressure. This cabinet contains approximately one-third of a cubic metre air space, in which the air pressure exceeds the normal atmospheric pressure to a sufficient extent to keep the lungs expanded. The head of the animal is inserted into this cabinet through a diaphragm, in a similar manner as in Sauerbruch's cabinet, the body remaining outside; the anæsthetist also introduces his hands into the cabinet through rubber cuffs and carries out the anæsthesia with an appropriate apparatus. Petersen has in this manner successfully operated upon the heart and lungs on a number of dogs. The simplicity and diminutive size of this apparatus undoubtedly has many advantages, but it seems to me that the anæsthetist works at a serious disadvantage under the conditions described above. Sauerbruch himself considered this method before it was developed in Heidelberg. He also made a number of experiments in this direction, but later abandoned the method because it seemed to him that there were many objections to its use, which I cannot discuss in this paper because of lack of time.

Although there has been little or no work done with the cabinet since my departure from Breslau, due to the paralyzing effect of the long illness and death of the Chief of the Clinic, and while there have been no more operations on man, still the indefatigable inventor has brought his work much nearer to perfection.

The results had been bad enough so far as suture of the œsophagus and infection of the pleura are concerned. We could all see that improvement here was imperative if future progress was to be made. Sauerbruch lost no time. While the surgical world began to look skeptically at the whole matter, he went back to animal experimentation, using now the larger chamber. It was self-evident that

many improvements in the technique of operation must be made, especially in the œsophageal work. This was a most difficult but also a most attractive problem. The œsophageal suture was more difficult than all else. As I have already stated, the unfavorable anatomical structure of the wall of the œsophagus makes it almost impossible to get a tight circular suture. There is no serosa, a weak muscular coat and a mucosa of little vitality. There is always great tension after the resection of a segment. As the stitches nearly always cut through, no matter how they are put in, food passes into the pleural cavity and the animal dies from empyema and pyæmia. All kinds of devices have been employed to make the suture secure and lasting. The suture has been modified in numerous ways, but to no purpose. *The stitches cut through.* Mikulicz had been the first to avoid tension on stumps by bringing a part of the stomach through the diaphragm and using it as a plastic covering for the œsophageal suture. This also made the suture more secure. Sauerbruch combined this idea with the use of the Murphy button, thus avoiding the suture entirely. In this way he obtained such good results that he claims the *Murphy button* to be the *conditio sine qua non* of all success in this work. He has operated upon dozens of dogs, all of which got well. These dogs now take all kinds of food except bones. In each of these dogs a piece of the œsophagus was resected, in some as much as three inches. The essential points in the operation are the intrapleural displacement of the stomach and an anastomosis between the œsophagus and the stomach by means of the button.

I might briefly describe the operation as follows:[1]

The animal is brought into the cabinet and fastened upon his right side. The pleural cavity is opened in the fifth intercostal space and the ribs are separated by the Mikulicz automatic rib retractors. The lung is pushed aside, whereupon the œsophagus and aorta and both pneumogastric nerves appear. We catch the œsophagus with a tenaculum forceps just above the hiatus, stretching it a little, and make, close to it, an incision into the septum diaphragmaticum which here consists entirely of pleura and peritoneum. This opening is sufficient to pull through the fundus ventriculi. The next step is the introduction of the Murphy button. This is done by an assistant outside the cabinet. With a bougie he first introduces the female half of the button, through the œsophagus as far as the stomach cavity. There it is caught by the operator and brought into that part of the fundus which was displaced into the pleural cavity. Here a very small incision is made through which the button is forced. The other half is introduced and pushed against that part of the wall of the œsophagus where the anastomosis

[1] Sauerbruch's Publications in Zentralblatt f. Chirurgie, 1905, No. 4; Verhandl. der deutsch Gesellsch. f. Chir., 1905, and principally in Mittheil. aus den Grenzgeb., 1905, 2.

is to be performed. A small incision is also made here, the button adapted to it, and both halves brought together and closed. No suture whatever is made. The last important step is the fixation of the fundus ventriculi to the diaphragm. It is done by suturing the protruding stomach all around the slit in the diaphragm. Of course the operation must be modified in some special points when performed upon man and under pathological conditions. When the button cannot be passed down the œsophagus, as will be the case in most benign strictures, in diverticula, and even in most carcinomatous conditions, the button must be introduced per ventriculum. In carcinoma, the resection should be done after the establishment of the anastomosis. When the anastomosis is finished, a strong silk ligature is passed around the œsophagus below the button and tied tightly. The carcinomatous piece of the œsophagus is then dissected off after isolation of the pneumogastric nerves. The lower end is closed in the same way and in addition is inverted in the stomach and buried by a purse-string suture exactly like an appendix. The upper stump is now covered by the fundus ventriculi.

All these procedures have been effectually carried out on the cadaver and there is no doubt that they will be applied to the living subject as soon as a new chief of clinic is appointed. Although the results which have so far been obtained have been only moderately successful it must be remembered that they follow only the earliest observations. When considering the three operations for carcinoma of the œsophagus we must remember that they were done before Sauerbruch's latest improvements in operative technique.

There is no doubt but that the opinion of Professor v. Mikulicz, which he expressed at the Congress in Berlin in 1904, is correct, when he stated, that we are entitled to the expectation of better and more satisfactory results. He hoped to be able to attack, aside from the above mentioned conditions, also injuries and defects of the diaphragm. He even suggested the possibility of interfering with certain valvular heart lesions, an American surgeon having already mentioned the incision of mitral stenosis. It would seem to me, that the method might be successful especially in the extraction of foreign bodies from the bronchi, for the treatment of diverticula of the œsophagus, and more especially for the removal of foreign bodies impacted in this organ. All of these operations would, of course, promise much better results than the carcinoma of the œsophagus. Naturally, the new method will first have its fatal results as has every other new operation. On the other hand, it must be remembered that the victim of carcinoma of the œsophagus has, without operation, only to await a certain, slow, and dreadful death. Should he recover from the operation he has a good chance for his life, as carcinoma of the œsophagus grows slowly, involves only late the neighboring glands and makes very late metastases to other organs. So we can easily see that here, as in many other

surgical conditions, an early diagnosis is essential. Sauerbruch remarks: "If cases of œsophageal carcinoma are sent to the surgeon in time, there will certainly now and then be found a case suitable for operation. That will likely, however, be true only far in the future." I have just received a letter from Sauerbruch in which he tells me that v. Mikulicz himself said to him only a few days before his death: "With our method we will make possible an operation for carcinoma of the œsophagus."

Das klingt ganz anders als der trostlose Ruf, in den bisher jeder Forscher nach vergeblichen Mühen und Arbeiten auf diesem Gebiete ausgebrochen ist: Lasciate ogni speranza!

THE SURGICAL TREATMENT OF HEPATIC CIRRHOSIS, WITH SPECIAL REFERENCE TO BILIARY DRAINAGE.

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In the issue of the *Boston Medical and Surgical Journal* for August 11, 1905, I published a paper relative to the value and indications of omentopexy in cases of cirrhosis of the liver with ascites, but in the present paper I intend only referring to drainage of the biliary tract in certain cases of hepatic cirrhosis. The surgical treatment of this condition has been simple exploratory laparotomy, laparotomy combined with destruction of adhesions, with or without massage of the biliary tract, and lastly, laparotomy followed by cholecystostomy. The first two interferences are not within the limits of this paper and consequently I will not refer to them again.

In the first place I would rapidly consider the most essential facts relative to the pathogenesis of hepatic cirrhosis, which may be defined as a generalized proliferation of interstitial tissue, accompanied by various pathological changes in the hepatic cell. In other words, a cirrhosis merely represents a chronic hepatitis which is the ultimate stage of an irritative process of the liver, having for a starting point the biliary tract or the bloodvessels. It is at the present time an established fact that infection is the primary etiological factor in certain cases of cirrhosis, the infectious agent being propagated from the intestine to the liver by way of the biliary tract. Hypertrophic biliary cirrhosis with chronic icterus represents the most perfect type of this morbid condition. But, in order to understand fully this question of hepatic pathology, one should not forget that roughly speaking the liver may be reduced to an hepatic cell, united to the intestinal tract by an excretory canal. The latter is in direct continuity, both anatomically and physiologically, with

the hepatic cell and represents one of the means of draining the liver, this duct is in direct continuity with the intestine and partakes of the pathological vicissitudes of the latter; and it may be safely stated that the sclerous process is the result of microbic invasion from the gut.

In the normal condition the biliary tract may be considered as absolutely aseptic and this normal asepsis also exists in the hepatic parenchyma, in very great contrast with the intensely septic condition of the intestinal mucosa which abounds in micro-organisms. I would, however, add that the last portion of the choledochus is normally the abode of two organisms, namely, the bacterium coli and the staphylococcus aureus. There consequently exists at the point of the anastomosis of the biliary tract in the intestine a transitional zone whose microbic flora is practically certain. As to the intestine, it is, on the contrary, the ordinary home for a large number of bacteria, and Gessner, as far back as 1889, made the statement that he always was able to discover the following organisms: 1. The bacterium tholocideum, a short oval bacillus, coagulating milk and pathogenic for mice. 2. The bacterium coli. 3. Two other bacilli, one of which liquefies gelatin. 4. Two staphylococci, one yellow and the other an orange yellow, liquefying gelatin. 5. The streptococcus pyogenes duodenalis, in all probability analogous to the streptococcus pyogenes aureus, so well known in pathology.

From this fact the biliary tract is in constant danger of infection from the numerous intestinal bacteria, and since the digestive tract is open to all kinds of external infections it may become infected occasionally by the most varied types of bacteria. Consequently, when the frontier which separates the aseptic canalicular zone from the infected intestinal zone is involved, an ascending biliary infection results. The bile and the walls of the biliary tract then offer all the necessary conditions for the culture and development of the various organisms, an angiocholitis being the first step of hepatic cirrhosis, the process being thus definitely created. However, before exposing the anatomical changes set up in the liver by chronic infection of the biliary tract, I shall endeavor to show that the part played by infection in the pathogenesis of biliary cirrhosis is based on precise facts. If, in the first place, we examine the bacteriological researches which have been undertaken on the bile of patients afflicted with cirrhosis, it at once becomes evident that the examinations have been invariably positive. For example, in Gilbert's case, an organism was found which differed from Escherich's bacillus in some of its characters, while in another instance an organism similar to the bacterium coli was discovered, and in Michaux's case the bile was infected by the colon bacillus, likewise in the case recorded by Pauchet. The presence of numerous pneumococci was easily made evident in Lejars' case. In my own cases

the bacterium coli was present in two and this organism in association with the staphylococcus aureus was found in the third. Pus has even been met with in the liver of cases of hypertrophic biliary cirrhosis, and Sabourin as far back as 1884 described a suppurating angiocholitis in this affection. A cloudy and purulent fluid has occasionally been found in the gall-bladder in cases of cirrhosis, and Hanot, Charcot and Gombault consider that hypertrophic biliary cirrhosis is in close relationship to those instances of hepatic cirrhosis following biliary lithiasis or experimental ligature of the choledochus when the biliary tract has been infected by bacteria. And still more, Charrin and Roger have been able to reproduce the lesions perfectly in their experimental work by directly injecting living or sterilized microbic cultures into the choledochus, while Gastou in 1895 developed the theory that Hanot's disease, to a certain extent, realizes the perfect type of infectious liver. In his remarkable memoir on cirrhosis, Chauffard, after having put aside intoxication as the probable cause of the sclerotic process, declares that many plausible facts plead the cause of infection *a priori*, and he adds that at a given time it surely intervenes in the form of an ascending biliary infection, even a pyogenic one, whose starting point must certainly be the intestine. Gilbert and Surmont unhesitatingly unite in one group the biliary cirrhoses which are, according to their way of thinking, infectious and they consider Hanot's disease as a consequence of an ascending infection of the biliary tract by bacteria coming from the intestine. From all this one can only conclude that the infection is foremost in the etiology of the sclerous process. Then, again, it may be added that in the affection that we are now discussing one will find the lymphatics of the hilum of the liver hypertrophied, as well as an hypertrophy of the spleen, leukocytosis accompanied by paroxysmal elevation of temperature, all of which are evident manifestations of an infectious process. The presence of bacteria having been demonstrated in biliary cirrhoses, two theories have been exposed based upon this fact. In the first a real pathogenic part is supposed to be played by the bacteria, which, in themselves alone, are sufficient to engender an infectious sclerosis, while the second hypothesis is that hypertrophic cirrhosis is accompanied by secondary infection. It matters very little, however, what explanation is admitted, and it is none the less true that at a certain time in the process there is infection.

Let us now consider the pathogenesis of the glandular and secretory apparatus of the liver, set up by the evolution of the infectious process. I have already pointed out that the biliary tract, which is aseptic in the normal state, is constantly menaced by the intestinal bacteria which are held in check by the physiological functions of the bile, and especially the hydraulic pressure resulting from the flowing off of this fluid. Now, if for any reason this equilibrium is interfered with, the intestinal germs will invade the biliary tract and

the infection will undergo its evolution under the form of an ascending catarrhal and obliterating angiocholitis. This catarrhal process ends in sclerosis of the biliary apparatus. At the International Medical Congress in 1897 Gilbert and Surmont expressed themselves as follows:

"L'infection peut s'etre limitée aux gros conduits, â la vésicule; la paroi biliaire n'est pas tou jours atteinte dans toute son épaisseur et avec la même intensité; la muqueuse peut avoir été seule lésée et même uniquement dans sa partie superficielle. On concoit done la possibilité d'un retour à l'état normal ou de la persistance d'alterations insignificantes. Que l'on envisa ge par contre une de ces infections atteignant les voies intra-hépatiques, persistant sous forme de poussées pendant des mois et des années; les lésions des canalicules, l'infiltration leucocytique des zones biliaires, l'apparition des cellules fusiformes à leur niveau, l'elargissement des espaces portes et la formation des néo-canalicules, l'envahissement conjonctif inter et intra-lobulaire; tels sont les résultats anatomiques successifs d'un tel processus; tels sont, en particulier, dans un certain nomber de cas, les résultats des angiocholites calculeuses. Elles aboutissent à la cirrhose biliaire, Il faut ajouter que dans ces circonstances la cellule hepatique reste pendant longtemps intacte ou qu'elle subit même l'hypertrophie et l'hypergénèse. Ainsi se trouvent donc réalisées des lésions indentiques à celles qui caractérisent l'affection qu'Hanot à individualisée sous le nom de cirrhose hypertrophique avec ictère chronique. Dans les deux cas le processus pathogénique et le processus anatomique sont les mêmes; mais ici, il s'agit d'une cir hose biliaire infectieuse spontanée ou sans obstruction, et là d'une cirrhose biliaire infectieuse avec obstruction."

To sum up, Hanot's disease is merely a subacute, ascending catarrhal, and obliterating angiocholitis, susceptible of becoming combined with cirrhosis, the latter being only a secondary phenomena added to the lesion of the biliary ducts. This is why in biliary cirrhosis, the result of microbic invasion, the particular form of the process after a time sets up irritative lesions rather than pyogenic ones of angiocholitis and chronic radicular periangiocholitis, and for this reason it is quite natural to foresee the excellent results that drainage of the infected biliary apparatus can give.

A word now as to venous cirrhosis, because one or two such cases have been submitted to surgical treatment and in one, at least, the condition of the patient was very markedly improved after drainage of the biliary tract; the ascites did not recur, the icterus disappeared and the general condition was greatly improved. This happy result causes me to query as to whether or not it is not logical to admit that infection also plays a part in this type of hepatic sclerosis where the agent of infection reaches the liver by way of the blood and the part played by infection appears to me most plausible on account of the fortunate result obtained by operative

interference. I would also recall in this respect that certain authorities have generalized the doctrine of infection to venous cirrhosis, thinking, for example, that, *a priori*, in cardiac cirrhosis or the hard nutmeg liver it is very unlikely that one is dealing with disturbances in the circulation only and that there must also be concomitant infection or intoxication, as has been expressed by the authors in the *Traité de Médecine*, edited by Brouardel and Gilbert. These same authorities state further on that it has been experimentally demonstrated that if biliary cirrhoses are of an infectious nature, vascular cirrhoses may be either toxic or infectious.

In considering the indications for operative treatment I will consider separately hypertrophic cirrhosis with icterus and hypertrophic cirrhosis without icterus: the first corresponds to the affection known under the name of Hanot's disease, while the second represents a class of badly defined chronic hepatitis, as yet insufficiently studied, but united to the former class by a mere pathogenic parentage; and thirdly, we have the vascular cirrhoses. In hypertrophic cirrhosis with icterus surgical interference is indicated for several reasons, the first of which is the absolute failure of medical treatment in the case of a disease which is inevitably fatal. I believe that physicians generally admit that in this affection the prognosis is unusually serious and that, although the evolution of the process is ordinarily quite slow, all cases observed up to the present time have ended fatally. Consequently, when these patients are left to themselves they are condemned to death, because no matter what medical treatment may be followed, even for a long time and under the best conditions, it is absolutely powerless to put a stop to the ever progressing evolution of hepatic sclerosis. Secondly, surgical interference is absolutely benign, and in this respect I would recall the opinion of Terrier, who says: "Il est, en effect, certain que l'exploration du foie, après incision sur la ligne médiane, est une chose possible, presque facile et d'une innocuité indiscutable des qu'on utilise la méthode antiseptique, soit meme la méthode mixte à la fois aseptique et antiseptique." And, still more, if one takes into consideration the operative results of cases so far reported, it will be found that the operative mortality has been excessively low. I believe for all these reasons that a well-conducted cholecystotomy is practically devoid of any operative gravity and the patients submitting to this operation run little or no risk. Thirdly, we have the happy results obtained by surgical interference and the question comes up as to whether or not the operative cure has given rise to therapeutic successes, both immediate and definitive. Without relating the many brilliant recoveries obtained by Terrier, Michaux, Delagenière and others I will merely add three of my own, which practically represent what others have experienced.

Case I.—M. H., a young man, aged twenty-four years, enjoyed excellent health up to the summer of 1901. At this time he com-

menced to experience the symptoms of acid dyspepsia accompanied by attacks of gastric pain. For five months these became more and more frequent and were frequently followed by icterus, while the general condition of the patient became poor. During the attacks of pain it appeared as if the gall-bladder was the seat of the trouble, but finally it extended over the liver. These attacks of pain and the icterus made me suspect that the patient was afflicted with gall-stones, although a careful examination of the stools after these attacks failed to reveal the presence of even the minutest calculus. The patient became wornout by constant pain, and, as he was losing flesh rapidly, operation was decided on in November.

Examination of the patient at this time showed that he had slight icterus; evening temperature 100.6° F. Digestion was difficult, the stools clay colored, and the urine contained biliary pigment, but no albumin. By percussion the liver extended two fingers' breadth below the ribs and palpation of the gall-bladder was painful. The heart and lungs were normal.

On November 27th the abdomen was opened in the semilunar line and the gall-bladder was found buried in quite dense adhesions, but careful exploration failed to reveal the presence of calculi either in the gall-bladder or in the ducts. The liver was enlarged, but regular in shape. After walling off the cavity the fundus of the gall-bladder was incised, giving exit to a dark purulent bile, and the finger introduced within its cavity showed that no calculus was present. The gall-bladder incision was enlarged and the walls were found thickened and soft, and after having carefully explored the under aspect of the liver and ducts for the second time cholecystostomy was decided upon, a large drainage tube being introduced into the organ. The results of this operation were perfect: there was no rise in temperature after the operation, and on the second day the dressings became soaked with bile, and at the same time the patient expressed himself as feeling greatly relieved. The drainage tube was allowed to remain for seventeen days, at which time the bile had taken on all its natural attributes, the icterus had completely disappeared, and the patient digested perfectly everything he ate. The drain was consequently removed and the patient was discharged in excellent condition with the biliary fistula closed twenty-seven days after the operation. Bacteriological examination of the bile taken at the time of the operation showed the presence of the bacterium coli and the staphylococcus aureus in large numbers.

I have followed this case since the operation and the patient has remained in perfect health ever since.

CASE II.—The second patient was a young woman, aged twenty-seven years, who gave the following history. She had been married two years and had had one labor at term, without complications. Five years ago typhoid fever, apparently rather severe. Menstruation always regular and painless. No history of biliary

calculi. However, I suspected from certain things that the patient was addicted to the use of alcohol. When the patient came under my observation she had been suffering from pain in the region of the gall-bladder for some nine months and had recently become quite cachectic. She was a frail woman and complained constantly of pain in the pit of the stomach, and which extended to the right side. Examination of the thorax negative. The urine was scanty, averaging about 750 c.c. in twenty-four hours, having a slightly acid reaction and a deep orange hue. Examination showed that it contained slight traces of albumin, a certain amount of pus, and bilirubin.

Upon physical examination of the abdomen the region of the liver felt tense and this apparent tumefaction extended to a little beyond the median line. It was hard and appeared somewhat movable, but was in no way connected with the genital organs, although it extended nearly to the right iliac fossa. As I could not make up my mind as to the diagnosis an exploratory incision was advised and accepted. An incision was carried from the costal border to below the umbilicus in the semilunar line, and when the peritoneum was opened the tumor was found to be nothing more than a greatly enlarged liver. The shape of the organ had, however, been preserved. The gall-bladder was exceedingly enlarged and sausage shaped, but no calculi could be felt either in the gall-bladder or the ducts. By raising up the border of the liver with the hand inserted deep into the abdomen it was an easy matter to bring the gall-bladder into the abdominal incision. On account of the apparent changes which the hepatic parenchyma had undergone, as well as the condition of the gall-bladder, I decided to do a cholecystostomy followed by drainage of the gall-bladder. This was carried out according to Delagenière's technique, which I will describe farther on, but was somewhat difficult of execution on account of the projection of the liver border.

The temperature which had oscillated around 102.2° F. before the operation dropped to the normal on the second day, and for the first four days following the interference a large amount of mucus was discharged from the gall-bladder. Bacteriological examination showed that this fluid contained the bacterium coli in large numbers. On the fifth day, however, the fluid from the drainage began to take on the appearance of bile, and during the next four days it gradually transformed until nothing but pure bile was found on the dressing. To make a long story short, the patient rapidly improved, her digestion became perfect, and the temperature remained normal. The tube was removed on the twentieth day, after which the fistula rapidly closed and the patient was discharged in excellent condition thirty-seven days after the operation. She was ordered a strict milk diet, which was continued for three months, after which time she was completely cured, and as far as my knowledge goes has remained so ever since.

CASE III.—A male, aged fifty-six years, was referred to me for chronic jaundice and occasional painful attacks in the region of the liver accompanied by a rise in temperature, this condition of affairs having existed for fourteen months. The abdomen was considerably distended with fluid, the patient stating that the abdomen had continued to enlarge for the past three months. The general condition was very poor: the patient had lost considerable flesh, the liver extended three fingers' breadth below the costal border, and with some difficulty the spleen was thought to be felt enlarged. The abdomen was opened and a large cirrhotic liver was exposed, with evidence of chronic peritonitis in the infrahepatic region. The gall-bladder was greatly enlarged, its walls thickened, but no calculi could be found within it or in the ducts. The ascitic fluid having been let out a cholecystotomy with drainage was done.

After the operation the temperature remained normal; the tube was removed at the end of one month, after which the resulting fistula permanently closed in about a fortnight. The bile obtained at the operation contained bacterium coli.

The after events were simple. The icterus disappeared, the appetite came back, and the patient made weight. Four months after the interference the general condition remained excellent, but the fluid had again made its appearance in the abdomen, so that puncture became necessary, removing seven litres of a dark-yellow thick fluid. After this the patient remained perfectly well, I having had news of him a year afterward, at which time he was fairly well, there being no trace of jaundice, and, on the whole, he appeared well pleased with his condition. However, the advanced stage of the hepatic process will naturally not allow a permanent cure to be obtained in this case, and it is evident that the patient will ultimately die of the process, but the operation certainly greatly improved his condition and without doubt gave him a lease of life of several years.

The majority of the considerations put forward above, relative to the prognosis and the ineffectiveness of medical treatment, may also be applied to cases of hypertrophic cirrhosis without icterus, and in looking over the reported cases it is most curious to note that the results obtained by surgical interference have been very good, mostly all resulting in a radical cure, or at least a very evident improvement. As to vascular cirrhoses, we may say in a few words what we have already indicated relative to hypertrophic cirrhosis with icterus: namely, that medical treatment is powerless to stamp out the process of sclerosis, although it should be remarked that contracted livers are less amenable to treatment than the large liver, and that the process inevitably terminates in death. That something may be gained by operative treatment in these cases, I believe is logical to suppose, and several cases have been reported

in which simple laparotomy has been sufficient to cause the ascites to disappear, likewise the cirrhosis itself in a few cases. Instances of this kind are numerous, but having no personal experience I will relate as an example one reported several years ago by Routier, where the patient was supposed to have a tuberculous peritonitis and an exploratory incision showed that in reality an atrophic cirrhosis was present; but the interesting part of the case is that the exploratory incision, followed by a few punctures for the ascites, afterward cured the patient in three months. In one of Delageniére's cases the question may arise whether it was the laparotomy or the drainage of the gall-bladder which caused the favorable result, but my own opinion is that the biliary fistula contributed greatly to the improvement of the patient's condition. Since the ascites did not recur it is probable that the drainage of the gall-bladder favorably influenced the phlebitis and periphlebitis of the portal and infrahepatic veins, and, so to speak, corrected the intrahepatic circulation, and, on the other hand, since the icterus diminished it is to be supposed that the drainage of the gall-bladder had a favorable action on the angiocholitis. However, we cannot draw any conclusions from a single case, and consequently it is only future experience which will teach us the truth.

Relative to the technique to be employed for draining the septic biliary tracts one may choose between cholecystogastrostomy, cholecystenterostomy, and cholecystostomy. The first two do not appear to be applicable to the cases that I am considering. The first is a very exceptional operation having special indications, while the second has the great inconvenience of turning back the infectious elements contained in the bile into the organism by throwing it off into the intestine. On the contrary, in cholecystostomy we have an ideal operation. The cutaneous fistulization of the biliary tract gives exit to the infected bile, and from this fact the biliary tract becomes thoroughly drained, even in its most remote intrahepatic ramifications, and, consequently, disinfection of the liver is admirably realized. The large majority of authors accept this way of thinking and consequently this operation is currently practised at the present time, but there is certainly a choice of procedure, because the classical cholecystostomy presents certain disadvantages. Without doubt the permanency of the fistula is the most serious objection, because it gives exit to a certain amount of bile continually and not infrequently requires a second interference for its closure, and, although there are numerous instances of patients who enjoy a satisfactory condition of health in spite of this loss of bile, it nevertheless is incumbent upon the surgeon to select a technique which will result in a temporary fistula. For this reason Terrier believes that one should make the fistula as small as possible in order to avoid a too abundant flow of bile and more especially in order to make the occlusion of the

fistula an easier thing to do. For the same reason Delagenière has worked out a technique by drawing the gall-bladder through a buttonhole made in the right rectus, so that the fistula will be more continent and more easily allow its closure. The opening of the gall-bladder is consequently furnished with a muscular sphincter, which holds the borders in contact as soon as the drainage tube has been removed. This change in technique has resulted in the formation of a true temporary cholecystostomy, the technique of which I will rapidly describe.

The incision is carried along the external border of the right rectus; in length it should be about 12 cm., a space which is usually sufficient for the introduction of the hand. Its starting point is at the costal border. Naturally the cutaneous incision should be longer than that of the aponeurosis and of the muscle, and the aponeurotic incision should be longer than that made into the peritoneum. In proceeding in this way there are many advantages which at once become evident and need no discussion. When the peritoneum is opened the gall-bladder is packed around with gauze sponges so as to prevent contamination of the abdominal cavity with the bile, the gall-bladder is drawn up and the fundus incised. After the bile has escaped the interior of the organ is explored with the finger and the field of operation being freely irrigated with salt solution in order to remove the septic contents of the gall-bladder, and the gauze compresses having been changed, the formation of the biliary fistula is proceeded with. At about 15 or 20 millimetres from the borders of the incision in the fundus a series of sutures are placed, including only the muscular layer and the peritoneum. The loops of these sutures are brought together, but are not interlocked. The gall bladder is then ready to be stitched in place. A running suture closes the peritoneum above the gall-bladder and then the two ends of each suture are passed through the neighboring parietal peritoneum. When this is done the peritoneum, below the gall-bladder, is closed with a running suture and nothing more remains than to tie each suture in the gall-bladder separately. The top of the gall-bladder which has thus been sutured to the parietal peritoneum projects into the wound, but this projection need not be greater than that necessary to protrude through the rectus muscle.

A buttonhole is made parallel to the fibres of the rectus, at about 5 to 6 millimetres from its external border and through this muscular buttonhole the fundus of the gall-bladder is pulled with a pair of forceps, and then the borders of the opening are united to the anterior aponeurosis of the muscle by interrupted sutures, which should include the entire thickness of the wall of the gall-bladder. Should it be found that the opening into the gall-bladder is unnecessarily large it may be lessened by a few interrupted sutures. A drainage tube which exactly fits the opening in the fundus of the

gall-bladder is then introduced. The closure of the abdominal incision should be done as in any other laparotomy.

The after treatment in this operation is usually simple. After the drainage tube has been removed permanently the fistula is allowed to close itself, a thing which usually takes place within a week or a fortnight afterward. The advantages of this operative procedure appear to me real, because the operation is easily performed. However, the most evident advantage that it presents, according to my way of thinking, is that the fistula closes almost immediately after the drainage tube has been removed. The time at which the tube should be permanently removed will vary considerably according to the condition of the gall-bladder found at operation, but usually the condition presented by the bile will allow one to suppress the drainage anywhere from a fortnight to three weeks afterward.

REPORT OF A CASE OF PARTIAL DISLOCATION OF THE FIFTH LUMBAR VERTEBRA UPON THE SACRUM.[1]

By Henry O. Feiss, M.D.,
of Cleveland, Ohio.

The question as to whether dislocation of a lumbar vertebra is possible has been discussed pro and con by many surgeons in the past. At any rate the lesion is considered a rare one, and especially rare when uncomplicated by fracture. Riedinger[2] has reviewed the subject of dislocation of the lumbar vertebræ quite recently, and himself reports a case of luxation of the fourth lumbar. He states as his belief that one of the chief reasons for its rare recognition is the difficulty in diagnosis. According to him, Baumueller in 1894 only had found seven cases. Hirschberg's is the only case since then up to Riedinger's.

The reason for the rare occurrence of the dislocation of the lumbar vertebræ is he mechanism of the joints. The articular facets face laterally, and it would seem from the skeleton that a dislocation could only take place in connection with a fracture of the articular processes. It would also seem from the skeleton that the relative obliquity of the articular facets connecting the fifth lumbar vertebra with the sacrum would predispose to a dislocation at that region as taking place more easily than between any of the other lumbar vertebræ. Although there is this anatomical predisposition, the following case is perhaps the first one of its kind

[1] Presented at the Clinical and Pathological Section of the Academy of Medicine at Cleveland, O., November 3, 1905.

[2] Archiv f. Orthopaedie, Mechanotherapie und Unfallchirurgie, Band ii., Heft 1.

reported. Even Riedinger in reporting his case is not able positively to rule out a complicating fracture, for he took no Roentgen picture.

A. C., aged twenty years, single, was first seen by me August 16, 1905. He worked in a hotel, running an elevator. Family history and past history are unimportant, and he was perfectly well until nine months ago, when a trunk fell upon him. The trunk fell upon his right side and pinned him firmly against a stair on his left side. After the injury he had severe pain and limped. There was ecchymosis of the right buttock. He limbered up, and later got stiff again. Soon he had to go to bed on account of pain. His legs became swollen and drawn up, the swelling occurring at

FIG. 1

Radiogram of a dislocation of the fifth lumbar vertebra.

the ankles, calves, and knees. The calves became hard. In April, about five months after the injury, he was again running the elevator, but suffering pain. He was sent to Mt. Clemens for a while, and had returned but only slightly relieved. At the time I first saw him he was troubled chiefly on account of pain and stiffness in his back, and severe pain in the ankles and calves. This pain was worse at night. He was also troubled with numb feelings and paræsthesia. He believed his legs were growing thinner. There were no bladder or bowel symptoms. Some cough.

The examination, when first seen, showed a fairly developed young man walking with a crutch. His gait resembled that of a tabetic, although it was not characteristically so. He threw his legs forward

rather forcibly, but landed on the ground gently with his feet. Chest negative. Arms, hands, and shoulders negative. Abdomen negative.

The examination of the spine showed that motions were quite free, except for a slight rigidity in the lowest lumbar region. The hip joints were limited in abduction. The knees showed nothing except a sharp click of the left one on flexion. The feet were in a position of marked valgus, with redness and swelling under the inner ankles, but motions were quite free and there was no spasm —they were cold, clammy, and bluish. There was no evidence of motor paralysis. The sensation to touch was normal. Hot and cold sense seemed unimpaired. Knee-jerks present and normal.

FIG. 2

Tracing of the Roentgen picture.

No clonus. No Babinski. Measured from the unbilicus to the internal malleolus the right leg was $\frac{3}{4}$ of an inch shorter than the left. Both thighs and calves were thin and atrophic, and the perineum was slightly broadened. The spinous processes showed a long left dorsal curve and a slight right lumbar curve. On consideration it seemed wise to take a Roentgen picture of the lumbar region. This picture (Figs. 1 and 2) showed an apparent displacement of the fifth lumbar vertebra $\frac{3}{16}$ of an inch to the right of the middle line, and a compression of the left side of the body of the same vertebra.

The interpretation of such a plate had to be made with great care. There were three hypotheses which might explain this

apparent displacement: first, distortion, due to the fact that the anode of the tube was not exactly over the centre of the picture; second, a dislocation at the sacroiliac synchondrosis; and third, actual dslocation.

To rule out the first we took another picture, placing the tube as nearly as possible over the centre. This second picture confirmed the previous findings. If there was dislocation at the sacroiliac synchondrosis the spine could be twisted with the sacrum, giving an apparent displacement at the region in question, but in taking our picture we pressed firmly upon the patient so that the sacrum was probably flat upon the plate. Moreover, actual measurements from the body of the vertebra to the junction of the crest of the ilium with the sacrum showed that the vertebra in question was $\frac{3}{16}$ of an inch nearer the right junction than the left. Therefore, in all likelihood we have to do with an actual dislocation.

The following day the patient was again seen and the lumbar sacral region was examined. There was no tenderness and no apparent displacement of the spinous processes. This was borne out by the Roentgen findings, for the spinous processes were in a line. The patient said, however, that a great deal of his pain was referred to that region.

A plaster spica was applied from the costal border, including the right hip so as to immobilize the lowest region of the spine. On August 21 the patient said the pain had gone from his back, but that he still had pain in the heels. He continued to improve, and on September 17 a new plaster was applied, including the left hip instead of the right. On October 1 we tried a plaster jacket instead of a spica, but the patient could not wear this. On October 3 we applied a tight canvas belt, with a pad over the sacrum, and ordered Thomas heels for his shoes, that is, a raise of $\frac{1}{4}$ inch on the inside of each heel. October 14, patient improved considerably. He gained altogether eleven pounds since we first saw him, and he continued to improve until October 28, when he came in limping badly on his right foot. Below the right inner ankle there was a fluctuating, swollen, red tumor. A Roentgen picture was taken which showed a spur on the os calcis, accounting for the pain in his foot and his limp. This affection in the heel has nothing to do with the trouble in his spine, and is merely a coincidence.

This is not a case of spondylolisthesis in which a lumbar vertebra is displaced forward, nor does it fall into that group recently reported by Goldthwait,[1] in which there is relaxation of the three pelvic joints, because this is not a relaxation, but rather a fixed malposition in a joint which is not, strictly speaking, a pelvic joint.

An interesting feature is the fact that the vertebra in dislocating shifted the superimposed spinal column so that the upper vertebræ

[1] Boston Medical and Surgical Journal, May, 1905.

moved with it. In other words, the case is more a dislocation of the vertebral column upon the sacrum than of the fifth lumbar vertebra taken by itself.

The fact that the spines are in line shows that the luxating movement has been a rotatory one, the body rotating on the sacrum, at some point near the spinous processes, as the pivot of motion. As to the compression or narrowing of the body on its left side, I believe that this had nothing to do with the initial injury. It is probably due to a new static condition in which the weight bearing has become shifted so that the weight of the superimposed spine comes unequally on the two sides of the body of the vertebra. The same sort of thing is seen in some marked cases of lateral curvature, in which considerable compression may take place. We have already pointed to the fact that there was lateral curvature in this case.

This case shows: first, that at least a partial dislocation of a lumbar vertebra may exist without complication of fracture; second, that it may persist unreduced and yet with improvement in the symptoms; third, that the physical signs may not be sufficient for diagnosis, and that a Roentgen picture is necessary for proof; fourth, there is very likely play in the articular facets, else there would be fracture; fifth, the chief sign of dislocation low down may be the change in the gait; sixth, that fixation is probably indicated in old unreduced cases.

THE PRACTICAL SIGNIFICANCE OF A TRACE OF ALBUMIN IN THE URINE.

By Joseph P. Tunis, A.B., M.D.,
MEMBER OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA, ETC.

The every-day occurrence of the question of the practical significance of a trace of albumin in the urine makes it of the greatest interest to medical examiners and clinicians, especially when unaccompanied by that other bugbear, "commencing general arteriosclerosis." My experience of the past four years prompts me, therefore: First, to review briefly some of the literature bearing on this subject; second, to epitomize the opinions of a number of representative physicians on certain phases of the subject; and third, to add such conclusions as may be suggested thereby.

By a trace of albumin is meant such a trace of an albuminoid substance as may be detected by the heat and nitric acid test or by Roberts' solution[4] properly applied—such a trace not to be accompanied by any tube casts of pathological significance *per se* in an otherwise perfectly healthy man. While a vast amount of literature bearing on this subject has appeared in recent years, much yet remains to

be written before anything approaching the final word shall have been said. Chemists may detect a trace of albumin in the urine of perfectly healthy men,[41] while on the other hand careless or improperly trained observers may overlook it when it is obviously present.

Dr. E. W. Dwight, says,[41] "While it is undoubtedly true that in certain cases a report of albumin is made by an inexperienced examiner when it does not really exist, it is my experience that the number is considerably greater where albumin is found on expert examination which has been missed by the average examiner." In the preparation of his admirable paper—"in so far as was practicable the entire medical literature of the subject for the past thirty years has been read, abstracted, and condensed."

He believes: "That the significance of albumin in the urine is purely symptomatic—in other words, that albumin and hyaline casts are a symptom of renal irritation or congestion, not necessarily to any extreme or even considerable degree. Acting on these principles during the past two years the New England Mutual Life Insurance Company has accepted 785 risks of this class, with an expected mortality of 6.8; and but one has died, and "he was blown up by an automobile."

In a critical study of this subject a number of terms are used:

1. *Normal* albuminuria—a nominal trace of albumin which may be found in the urine of all human beings if the tests are applied with sufficient delicacy and frequency.

2. *Spurious* albuminuria—a condition of the urine dependent upon a local inflammation such as urethritis, prostatitis, cystitis, etc., and not, therefore, of renal origin; in brief, "extrarenal."

3. *Physiological* albuminuria (*vide* G. Klemperer[10])—the presence of small quantities of albumin which appear in some persons as a *transient* constituent of the urine after a meal rich in albuminoids, after intense physical strains, after hot baths, and after psychical excitement.

4. Under *functional* albuminuria, J. Dixon Mann[28] gives (*a*) the albuminuria of *adolescents*.[2] (*b*) *Cyclic* albuminuria (early morning urine free from albumin, which begins to appear about 10 or 11 o'clock, declines in the afternoon, and by evening has disappeared). Such a condition usually occurs in youth. (*c*) *Postural* albuminuria and (*d*) *alimentary* albuminuria. Examples of each are cited. Dr. James Tyson informs me that he has seen examples of each of these conditions, and in a paper read recently in New York,[39] he cites the case of a boy in whom the ingestion of a single egg produced marked albuminuria."

Klemperer also says: "The presence of albumin (serum albumin and serum globulin) in the urine indicates a lesion of the renal epithelium. Pronounced persistent albuminuria indicates nephritis."

Other terms, such as accidental,[26] dietetic, intermittent,[20] ortho-

static,[42] temporary,[3] etc., are also encountered, but I shall confine myself to the so-called *physiological* type more particularly.

Dr. Tyson,[32] in a chapter devoted to the history of the development of our knowledge of nephritis, gives due credit to Richard Bright's classical paper of 1827 and adds: "The more recent labors of Bright (*i. e.*, 1831) added much to our information and approached astonishingly our present knowledge." Bostock,[1] in 1827, says that the urine of a perfectly healthy man can show albumin under slight causes. T. Grainger Stewart (1888) says among other conclusions:[6]

"1. There is no sufficient proof that albumin is normally discharged from the human kidneys.

"2. Albuminuria is much more common among presumably healthy people than was formerly supposed, being demonstrated by delicate tests in nearly one-third of those examined.

"3. The existence of albuminuria is not of itself a sufficient ground for the rejection of a proposal for life insurance.

"9. Violent or prolonged exertion often induces albuminuria.

"10. Cold bathing produces or increases it in some individuals."

In order to secure a consensus of present-day opinions a letter was sent to about twenty representative physicians asking the following questions: 1. Is there such a condition as physiological albuminuria? 2. Have you had under your observation any case or cases where a trace of albumin has been present in the urine for ten years or longer in an apparently perfectly healthy man? 3. Do you not think that the mortality among cases showing continuously a trace of albumin is much greater than among an equal number of healthy lives during the same period?

In answer Dr. James M. Anders writes "yes" to all three questions and adds with the latter "many merge into actual renal disease."

Dr. Richard C. Cabot, of Boston, answers "no" to the first two questions and "yes" to the third. In regard to the third question all but two of the answers are affirmative.

Dr. H. M. Christian, in his answer, refers to an abstract of the paper of Wright and Ross[43] as expressing his views on the subject.

Dr. Judson Daland writes: "Albumin as determined clinically by heat and nitric acid, in my experience, has always been pathological. I have seen cases where a trace of albumin was intermittently present in the urine for a period of ten years or thereabouts in an apparently healthy individual. Certain of these cases passed from my observation so that I do not know their history. In one instance, however, the patient died of uræmia fifteen years after the first appearance of albumin."

Dr. H. A. Hare says: "I do not believe there is *physiological* albuminuria except in those instances where an excess of albumin has been ingested. I, however, believe that there can be albuminuria without nephritis, and this class of cases would probably come under that commonly applied misnomer "physiological albuminuria."

In regard to question 2, I have had a number of cases in which albuminuria lasted for many years without apparent ill-effect, but in the end they all succumbed to chronic contracted kidney."

Dr. Morris J. Lewis says: "1. I believe there is a physiological albuminuria, although I hesitate to make this diagnosis unless all other investigations fail. My personal experience seems to uphold this view. 2. One patient of mine, when a girl (1892), had pronounced albuminuria after dancing, from a trace up to 50 per cent. by bulk, and *none the next day.* This was repeatedly verified during ensuing years. She subsequently married, had three normal labors, and died one year ago of an acute infection, with a good pair of kidneys. Was this physiological albuminuria?"

Dr. J. H. Musser, in reply to question 1, writes: "An albuminuria exists not incompatible with good health." He answers question 2 in the affirmative. In reply to question 3, "I cannot say."

Dr. J. A. Scott, answers all three question by "yes," and in replying to the second, says, "Not more than two, for the simple reason that we lose sight of these men after a certain length of time and cannot, therefore, state that they are now in perfect health."

Dr. F. C. Shattuck, of Boston, answers question 1 by "I think not" and 2 by "yes, several." He declines to answer (3) without consulting his records, which would take too long.

Dr. Wharton Sinkler writes: "Question 1, I am unable to answer. Question 2, I have had a number of patients under my care where there has been a trace of albumin in the urine for more than ten years in an otherwise apparently healthy man. I have seen other cases in which a trace of albumin was present for a number of years in individuals who were in fairly good health, but evidently had nephritis, and who lived for many years, to die of an intercurrent disease. Question 3. I have not sufficient data to answer accurately, but my judgment would be that the mortality among cases showing continuously a trace of albumin would certainly be greater than in persons not exhibiting this symptom."

Dr. Alfred Stengel says: "I doubt the existence of a physiological albuminuria in the strict sense. No doubt traces of a proteid substance may be quite common in the urine in practically healthy persons. (2) I have treated several cases in whom there was almost constantly a trace of albumin for ten or twelve years, and I know of a number in whom the records previous to the time of my treatment indicate the existence of traces of albumin from time to time during even a longer period. (3) I believe that the constant presence of a trace of albumin indicates a much more serious condition of things than occasional traces. I would not presume to express a positive opinion based upon the presence of a trace of albumin without reference to the clinical conditions as a whole."

Dr. James Tyson answers "no" to the first question and "yes" to the second. In reply to the third, he says that he has no reason to believe so if the albuminuria is unaccompanied by other signs of Bright's disease.

Dr. J. C. Wilson writes: "1. I am not disposed to regard the transient albuminuria which occurs after excessive fatigue, forced marches, and under other conditions not clearly defined, especially in adolescents and young adults, as physiological. This is, however, a question of terms. 2. I have had a number of men under observation in whom in the absence of clinical evidences of substantive disease of the kidneys there has been occasionally found albumin in the urine usually coincident with some trifling illness. I do not often have the opportunity of examining the urine of people who regard themselves as perfectly healthy."

Dr. Robert N. Willson says "yes," if by this is meant a temporary albuminuria, the expression of a temporary embarrassment of the kidneys, as from violent exercise, etc.; "no," if one means albuminuria in the absence of such a temporary embarrassment. To question 2, he answers "no," and to question 3, "I am sure of it. I have, moreover, come to the conclusion that every trace of albumin found constantly in the urine has a pathological cause."

Dr. William R. Bross, Medical Director of the Equitable Life Assurance Society, writes: "My personal experience, covering a number of years, with a vast amount of material from which to judge, is that albumin in the urine of an apparently healthy individual is of pathological significance. I do not mean to imply that I consider it an evidence of Bright's disease, but it is an evidence that something is wrong, and if we cannot determine the cause it is due to our lack of diagnostic ability. I will admit without argument that many albuminurias are transient, but up to the present time we have been unable to determine when a case came before us just which road it would travel. In the insurance world we have no opportunity of studying these conditions, as the clinical physician has, and are only familiar with the results, and even these are meagre."

Dr. E. W. Dwight, Medical Director of the New England Mutual Life Insurance Company, objects strongly to the use of the term physiological albuminuria. He answers "yes" to question 2.

Dr. C. H. Harbaugh answers "no" to the first question and in reply to question 2 says: "I examined a man last week who was rejected for albuminuria in 1892, 1898, 1903, and last week when he still had albumin. This man is thirty years of age, a bookkeeper, married, seventy-five pounds over normal weight, and to all appearances in the best of health."

Dr. Oscar H. Rogers, Medical Director of the New York Life Insurance Company, writes "no" to the first question; in reply to the second he says, "Not under continuous observation, but

many cases which have been observed at infrequent intervals over a period of ten or more years."

Dr. Oliver P. Rex, Medical Director of the Penn Mutual Life Insurance Company, answers "no" to questions 1 and 2; in reply to question 3 he says, "We do not think that the mortality among cases showing continuously a trace of albumin is much greater than among an equal number of healthy lives during the same period."

Dr. J. F. Stone, Chief Medical Examiner for the New York Life Insurance Company in Philadelphia, writes: "1. This is largely a question of definition. If you mean by albuminuria a condition of the urine where albumin is present in easily recognized quantities by an ordinary test, my answer would be that there is no such condition as "physiological albuminuria. If you define albuminuria as the presence of albumin in any quantity—however minute in the urine—then I believe there is such a condition as physiological albuminuria. 2. I have several such cases, and one especially which has been under my observation for twenty-seven years, with general health absolutely unaffected."

Dr. L. C. Stillings, of the same Company, answers "no" to the first question, and "yes" to the second; adding, "My experience, however, with these cases is that in time if the condition is renal they break down." His deductions are drawn from approximately fifteen thousand examinations for insurance.

Dr. Charles H. Willits, Medical Director of the Provident Life and Trust Company, answers "no" to the first question and "yes" to the second. He also answers "yes" to the third question adding "Although I do not think the mortality is always excessive."

Personally, I do not believe that the term physiological albuminuria is a good one; certainly not from a medical examiner's point of view. The term *transient* albuminuria would seem a preferable term, meaning by that a condition of the urine due to increased blood pressure brought about temporarily. In reply to question 2, I recall the case of a physician of this city, aged forty-three years, whom I have repeatedly examined for life insurance. For fifteen years he has had a trace of albumin in the urine following an attack of typhoid fever during convalescence from which cystitis developed. This condition of the bladder was probably due to the improper use of a catheter. He has always received graded policies as the result of this albuminuria. He has every appearance of perfect health and is an active practitioner. It is quite probable in this case that there has been a slight resulting irritation of the prostate gland as a sequel to his cystitis, sufficient to account for the albumin. There have been no casts of sufficient importance to throw any additional light on the condition of his kidneys. During the four years that he has been under my observation there is not the slightest deterioration in his health. What examiner, however, would be bold enough to make such a statement to his medical director and suggest that

such a case be given a standard form of life insurance? In this connection it is interesting to note the paper of Edgar G. Ballenger[40] on "*Prostatic* Albuminuria." In his conclusion this writer states: "1. The secretion from an hyperæmic or an inflamed prostate is albuminous, while that from the normal gland is not." "In making insurance examinations, as well as in the diagnosis of obscure forms of albuminuria, this possibility should be eliminated with the other sources of contamination before reaching a positive conclusion as to the significance of albumin."

Dr. Stengel[36] in a recent paper says: "The kidney is excessively prone to slight and transient alterations which in all probability will undergo satisfactory resolution without permanent impairment of the integrity of the organ. . . . I do not wish to convey the wrong impression that I estimate lightly the importance of urinary examination; far from it. But I know from much experience that a trace of albumin is too often magnified in importance in the physician's mind, and that the clinical conditions as a whole are not sufficiently considered."

Dr. W. B. Vanderpoel, Medical Director of the New York Life Insurance Company, is quoted in an editorial[21] for March, 1903, as saying that the mortality of cases refused life insurance during the past fifteen or twenty years for albumin is *four* or *five* times greater than among an equal number of healthy lives during the same period. This group must necessarily have included a large proportion of cases in which other evidences of poor health were present at the time of examination. Corroborating this Dr. N. S. Davis, Jr., of Chicago (1902), has watched many of these cases declined by life insurance examiners and "little by little a chronic diffuse nephritis develops."[19] In this connection is it not of some comfort to the often harshy criticised medical examiner to reflect that by calling attention to an unsuspected trace of albumin many useful lives have been considerably prolonged?[14]

It will be admitted without argument that tube casts of pathological significance may be found in some specimens of urine in which no trace of albumin has been detected by the tests herein mentioned, even in skilled hands. In other words casts may be present without albumin.[22] Furthermore, experience proves that "a faint trace of albumin" in the urine of an apparently healthy man often leads to the detection of tube casts of real prognostic significance.

Wright and Ross,[38] in a paper on "The Discrimination of Physiological Albuminuria from that Caused by Renal Disease," cite seven cases and suggest the possibility of so discriminating by the exhibition of calcium salts. They recommend that doses of from forty to sixty grains of calcium lactate be given "to increase the coagulability of the blood." They claim that the use of this drug increases the amount of albumin present in the urine in true nephritic cases very considerably, while it has no effect whatsoever on the normal kidney.

Considerable experience with this drug in the hands of several observers will be necessary before any conclusions of real value can be reached. It seems, however, a practical suggestion that in cases of doubt this harmless drug should be employed to determine whether the trace of albumin is only a transient constituent of the urine. Similarly the use of four ounces of syrup (or 100 grams of sugar) in soda-water and an examination of the urine two hours afterward may be employed to determine whether diabetes exists in a suspected case.

C. E. Simon,[8] in his *Clinical Diagnosis*, writes, "It may safely be said that a transitory, intermittent, and cyclic albuminuria is not infrequently observed in apparently healthy individuals, but that the facts so far brought forward do not warrant the assumption that such forms of albuminuria are physiological."

A. Oswald,[29] writing in 1904, does not think there is such a condition as physiological albuminuria. He believes that it is the result of an injury to the renal epithelium, and it must therefore be considered at least transiently pathological.

A. C. Croftan[30] disapproves strongly of the term physiological.

Dr. William Osler, in an article with the startling title "On the Advantages of a Trace of Albumin and a Few Tube Casts in the Urine of Certain Men above Fifty Years of Age,"[14] mentions three cases which were refused additional life insurance on account of a trace of albumin and a few hyaline casts. These cases were subsequently under observation from eight to ten years or longer. All three enjoyed vigorous health from fifty-five to sixty-five years of age or longer. He believes that in men of fifty or sixty years of age, albuminuria is by no means infrequent and is not always serious. Dr. Osler called attention in this article to three indications pointing to serious disease: (1) persistent low specific gravity of the urine from 1008 to 1012; (2) the state of the heart and arteries; (3) the presence of albuminuric retinitis. In conclusion he says: "Let me not be misunderstood: a trace of albumin and a few tube casts are danger signals, the red lights which may mean an open drawbridge or a wrecked road ahead; but they may be simply warnings to the engineer to 'go slow,' that the pace is too rapid for the state of the track."

When the heat and nitric acid test is properly applied with a suitable background for observing the heated portion carefully there can be no better test for all practical purposes. It is well, however, to have another control[37] test at hand when there is any possibility of doubt in the mind of the examiner. For this purpose Roberts' solution,[4] consisting of one part of nitric acid to five parts of a saturated aqueous solution of magnesium sulphate, is of great use, especially when employed in the horismascope or some similarly arranged tube. Especial care should be used in employing the latter test that the urine and the solution should not remain in contact for more than *two* minutes. Any faint reaction which appears at the

point of contact after two minutes have elapsed may be ignored. The advantages of using Roberts' solution are: 1. That the albumin ring appears as a distinct white line at the point of contact, the presence of the sulphate of magnesium preventing the brownish ring which is so frequently present in Heller's test. 2. It enables a rough distinction to be made between mucus and albumin, the former appearing as a diffuse cloud *above* the point of contact. This distinction is of particular value in the examination of women. 3. When the specimen is of small volume the horismascope[26] often enables one to make a thorough examination for albumin when the quantity would not have been sufficient for the heat and nitric acid test. 4. Serum globulin is thrown down by this test better than by the heat and nitric acid. 5. The apparatus required is exceedingly simple. The delicacy of this test is equivalent to that of the heat and nitric acid test. It will show one-hundredth of one per cent. of albumin very clearly—or "a trace"—up to the two-thousandth of one per cent.—or "a faint trace"—beyond which it is not necessary to go.

CONCLUSIONS. 1. From any point of view the term "physiological albuminuria" is almost universally regarded as misleading, unsatisfactory, and inadequate.

2. As long as albumin is a constituent of the urine the individual voiding it cannot be regarded as normal.

3. The mortality among such persons must necessarily be higher than among an equal number of individuals who do not show this phenomenon.

4. The actual mortality rate among this class can best be approximated by a comparison of the records of half a dozen of the largest life insurance companies (dealing with hundreds of thousands of cases) over a period of twenty years at the least.

5. The prompt means of discriminating between the transient forms of albuminuria and those of real clinical significance may be found in some such therapeutic test as that of calcium lactate rather than by any further developments in the chemistry of the urine.

6. Experience proves that "a faint trace of albumin" in the urine of an individual past middle life is often of greater significance than "a decided trace" by unexpectedly directing attention to the finding of casts of pathological importance, which might otherwise have been easily overlooked.

7. For practical purposes the heat and nitric acid test for albumin is the best one, and the careful use of Roberts' solution the most satisfactory control test in doubtful cases.

8. For the proper diagnosis and prognosis too much stress cannot be laid on a thorough consideration of the clinical conditions as a whole.

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ALCOHOLIC MULTIPLE NEURITIS.[1]

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Multiple neuritis is as a rule easily diagnosed. Its differentiation from cerebral palsy is never difficult, but sometimes it is almost impossible to determine whether or not there is also disease of the spinal cord. In children the question may arise whether acute anterior poliomyelitis or neuritis is present. In both there is a flaccid palsy, with muscular wasting, changes in the electrical reactions of the muscles and loss of the deep reflexes, but in the former there is never muscle pain, nerve tenderness, nor areas of skin anæsthesia. In acute transverse myelitis anæsthesia extends to a well-defined boundary on the trunk and is not limited to the distribution of certain cutaneous nerves; there is not marked pain, the bladder and rectum are always affected, and bed-sores are common. The difficult cases are those in which multiple neuritis being admitted the question is, Is the cord involved. The surest sign of such involvement is incontinence of the bladder and rectum. Pseudo-incontinence may result from lack of attention on the patient's part from delirium, stupor, or dementia, but true incontinence almost surely proves spinal cord disease. Very rarely neuritis of the pelvic nerves may cause it. Slight changes in the spinal cord are common in cases of neuritis in which the inflammation has not been confined to the peripheral distribution of the nerves but has extended upward. Such changes, however, do not cause any new symptoms. On theoretic grounds several authors maintain that at the beginning of a

[1] Read at the meeting of the Philadelphia County Medical Society, March 14, 1906.

neuritis the deep reflexes are always increased, the argument being that in all inflammatory processes excessive irritability precedes decrease or loss of function. This is certainly true of inflammation affecting nerve cells unless it is so severe and sudden as to cause immediate destruction of the cells, but it is doubtful if it is the case in inflammation of motor nerve fibres. It is much more likely that in all cases in which the knee jerks are increased the spinal cord is diseased, or the sensory nerves are so much more affected than the motor that the pain reinforces the reflex. Certainly, when the knee jerk is spastic, *i. e.*, not merely larger in amplitude but quick in response, rapid in movement, and associated with an increase in muscle-tone, disease of the cord exists. Symmetrical distal, without proximal, palsy of the arms or legs, or both, is always neuritic.

Much more difficult than the recognition of the seat of disease is the determination of its cause. The diffusible stimulants, acute infectious fevers, especially typhoid, several metallic poisons, and some chronic diseases all cause multiple neuritis. Some cases must still be called idiopathic. In such, the symptoms come on acutely and in the absence of any known cause. Such cases are due to an intoxication affecting the peripheral nerves primarily, but whether the poison arises within or without the body is unknown.

In only a few types of multiple neuritis, *e. g.*, diphtheritic neuritis, are the symptoms distinctive enough to enable a diagnosis to be made from them alone. Often the history of the work and habits of the patient must be known to form a correct opinion. Sometimes more than one cause has been or may have been operative, *e. g.*, lead and alcohol, childbirth and alcohol, some acute fever and alcohol. Owing to the widespread use of alcohol and the frequent impossibility of discovering how much it has been abused there is a tendency to assume it is the cause when it has not been a factor.

There are two distinct types of alcoholic multiple neuritis, the one chronic throughout its course, slow in onset, slow in its progress and lasting it may be for many years, the other distinctly acute but preceded by a longer or shorter period of prodromal symptoms. Many of the acute cases are engrafted upon the chronic disease. The factors that cause one man to have chronic neuritis and another an acute outburst are unknown.

Slight or not very severe neuritis is very common in middle aged drunkards. Sometimes the only symptoms are muscle pain and nerve tenderness in the legs and cramps at night. The pain may be a mere dull ache, localized soreness, or sharp and shooting. Frequently there is in addition to pain some weakness in walking, a slight paresis, more rarely distinct but not complete palsy, especially of the anterior tibial muscles, causing foot-drop and steppage gait. The knee jerks are decreased and later absent. Some patients have a pseudo-ataxic gait. They always present the general symptoms of chronic alcoholism. The disease is sometimes mistaken for

locomotor ataxia. The gastric attacks of alcoholic gastritis may simulate the crises of locomotor ataxia. Paræsthesia of the legs and feet are not uncommon, the patient complaining of numbness in the feet, more rarely in the hands, a feeling as of ants crawling on or under the skin, localized sensations of heat and cold in the feet or legs, and even the sensation of walking on thick carpet. Areas of tactile anæsthesia are present in the legs. On the other hand, Argyll-Robertson pupil is never caused by alcohol alone. It should be remembered, however, that in and after middle life the pupils are normally a little small and the irides distinctly less prompt and with a smaller amplitude of movement in responding to light. Forgetfulness of this sometimes causes erroneous conclusions to be drawn. Again, alcoholism never produces rectal, vesical, or other true crises. There may be slight muscular wasting in the legs, but trophic changes in the joints never occur. The gait may simulate ataxia. The symptoms may remain stationary for a long period, even years, and are often greatly improved by abstinence and medical treatment. Some of the cases of alleged locomotor ataxia cured by various measures are really cases of chronic alcoholic neuritis.

The following (Case I) is a fair example of the milder type: A. B., a white man, aged forty-five years, was admitted to the Philadelphia Hospital complaining of shooting pains in the legs and abdomen. The pains began about five years before his admission and for a long time had been so severe as to disturb sleep. Frequently also he had painful cramps in the calves after going to bed. He never had any real cramps in the hands, but they often felt "drawn up and stiff." He had no trouble in walking except from pain.

Examination. He was a well-built, well-nourished man, who walked well but swayed slightly on standing with the eyes closed. There was neither palsy nor ataxia of the arms. The knee jerks were very feeble, the triceps and biceps jerks were plainly present. The pupils reacted sluggishly to light and with accommodation. All ocular movements were normal. Tactile sensibility was no mal everywhere. The nerves and muscles of the legs were painful. After three months the pain and tenderness had entirely gone and the knee jerks became normal.

Cases like this are more frequent than hospital statistics indicate. Many patients never become ill enough to go to a hospital. Many who come to such hospitals as Blockley show the influence of exposure and bad or little food in suddenly increasing the severity of the symptoms. After they have been in the hospital a few days they begin to improve and a patient who looked seriously ill, after a few months, largely recovers.

Acute multiple neuritis is much more important than the chronic type. It is very doubtful if it ever occurs as long as the digestive processes are carried on normally. It is extremely rare among young drunkards, and seems to require disease of the stomach and

liver for its development. It is most likely not a direct poisoning of the nerves by alcohol, but the alcohol probably so alters the chemical processes of digestion as to produce poisons within the body which in turn act upon the nerves. The curve of the age liability to the disease is very interesting. Below twenty years it is almost zero, from then till the thirtieth year there is a rather rapid rise which becomes almost abrupt in the early part of the next decade, sinks rather slowly to the fiftieth year, and then falls abruptly. After sixty years the disease is a rarity. The cause of this fall is of course not that age gives immunity but that most drunkards die before the sixtieth year. The view one time held by some writers that beer never causes neuritis has been proved to be an error, but whiskey drinkers fall victims more surely than beer drinkers. Periodic drinkers who abstain between times run much less risk than the man who is never drunk but takes a little too much every day. How much alcohol must be taken to produce neuritis is a variable quantity depending upon inheritance, the man's mental, emotional, and physical make up, and the amount and kind of work he does. The influence which station in life exerts is very difficult to determine. More laboring men suffer than any other class but they make up the large bulk of the community. A very large percentage of them use alcohol and many suffer from exposure and bad food. The greater percentage, though the absolute number is much smaller, of cases probably occurs in people who do little or no physical work. In other words, a man who does physical work or who takes much exercise probably can drink a larger amount without harm than the man who does neither. Statistics on the influence of sex vary. In my own experience women have much outnumbered men. I believe they are more liable to the disease.

Though the severe stage of the disease is acute, or at least subacute in onset, there is always a longer or shorter prodromal period characterized by slight muscular pain, nerve tenderness, paræsthesia and muscular cramp usually affecting the calves at night and very rarely appearing in the forearms. As a rule, too, there are marked symptoms of digestive trouble, a coated tongue and foul breath, anorexia, constipation, and even vomiting. Sometimes the attack follows immediately after or begins during delirium tremens. After the prodromal stage there is a sudden or rapid increase in the symptoms. The muscle and nerve-trunk pain becomes intense, and the skin, especially on the soles and palms, so hyperæsthetic that mere contact causes agony. Peripheral palsy of the legs, less frequently of the arms and involving principally the extensor muscles, causing foot- and wrist-drop, comes on. The palsy may become so extensive and severe that all power of movement of the limbs is lost. The deep reflexes are abolished. The palsied muscles become soft and later waste, and the electrical reactions change quantitatively. Typical reaction of degeneration occurs. The palms and soles

sweat profusely. The nerve trunks are exquisitely tender and may be palpably swollen. Slight fever may be a part of the disease but hyperpyrexia proves some complication. The skin especially of the legs undergoes trophic changes, becoming smooth, hairless, glossy and thin. The toe nails grow less quickly and become ridged, roughened, brittle, and thickened. The return of normal growth at the root of the nail is a good sign. In uncomplicated cases the bladder and rectum remain under good voluntary control. Some patients suffer cranial nerve palsy, but it is more than possible that such cases are mixed, *i. e.*, something more than alcoholic neuritis is present.

Almost every case of acute alcoholic neuritis presents some mental symptoms. Sometimes there is only a little confusion with marked emotionalism, or a distinctly hysteroid state, but not infrequently there is the picture described by Korsakoff in 1887. Since his paper was published a great deal of attention has been given to the matter. The cardinal symptoms are loss of memory, confusion, and fabrication. A typical case begins with delirious excitement. Mental confusion is very great. Memory for recent events is always bad but the power of recollecting occurrences of early life may be fairly well preserved. Fabrication, believing in and relating events that never occurred, is characteristic. The patient may quietly and with absolute cetainty of belief say that he has done things which never happened. Imagination is increased and is uncontrolled by reason. The patient may say he went out driving yesterday or was visited by an old friend to-day when really he has been bedridden for weeks and has had no visitors. He may imagine the doctor and nurse are old friends. Visual and auditory hallucinations are frequent in some cases, absent in others. A woman long past the menopause sees her newborn baby in bed with her and fondles and nurses and talks to it. No attention is given to the surroundings, and a patient in a large hospital ward filled with patients may think he is at home, or if at home may not recognize his own room and think he is in a strange place. Even when the mental confusion is very great he may be able to answer a few simple questions intelligently, but he soon passes again into his own inner world. Time has no meaning to him and the facts and fancies of to-day are mixed up with the things of years ago. At the beginning the emotional state is one of anxiety, but later the patient becomes peevish and even quarrelsome, or grandiose or sillily happy. These mental symptoms may precede, accompany, or follow the onset of the physical signs of disease, but they never begin after convalescence. The duration may be long or short, and improvement, once started, may come on rapidly within a day or two or slowly, extending over many days or weeks. It is usual to call this complex of symptoms Korsakoff's psychosis, but many years ago, in 1791, Lettsom published the sixth edition of a little pamphlet entitled *History of Some of the Effects of Hard*

Drinking, in which the essential symptoms are clearly, briefly, and accurately described. His words are "they talk freely in the intervals of mitigation, but of things that do not exist; they describe the presence of these friends as if they saw realities, and reason tolerably clear from false premises." Though this complex of symptoms is common in alcoholic neuritis it is seen in other conditions. It occurs in alcoholism without neuritis, in neuritis from other causes, is an occasional incident in cerebral syphilis and cerebral trauma, and may be an event in the beginning stage of senile dementia. Unlike Korsakoff, Lettsom knew of its occurrence only in alcoholic palsy.

The prognosis in multiple neuritis without serious mental symptoms is as a rule good. The patient may die in the acute stage from cardiac palsy or exhaustion or some complicating infection, or he may survive with only slight mental impairment and a little foot-drop. Sometimes recovery is complete, but as a rule, if marked mental symptoms have been present, the edge is taken off the mind and the man previously mentally alert is left slow, dull witted, indolent, with somewhat defective power of attention and lessened capacity for work. Sometimes he survives with marked permanent dementia rendering him wholly unable to care for himself for the remainder of his life. The occurrence of marked mental symptoms increases the danger to life.

The following history (Case II) is a good example of the difficulty sometimes met with in discovering the cause. The patient, an Italian laborer, aged thirty-three years, was brought to the Philadelphia Hospital in November, 1905, complaining of "inability to walk and heaviness in the arms and legs." He was only a moderate drinker. He gave no history and showed no signs of syphilis. He had been, according to his own account, treated at the Pennsylvania Hospital in September last for typhoid fever. I have been permitted to see the records of his case there, and they negative that diagnosis. The notes state he was admitted on October 5th, with a temperature of 102°, pulse rate of 96, and respiration rate of 20. He had been ill about six days. The illness came on with vertigo, vomiting, and pain in the region of the liver. The only physical signs present indicated acute bronchitis. The temperature rapidly fell to normal, all symptoms passed away, and in nine days he was well. The Widal reaction was negative. While at the Pennsylvania Hospital he showed no signs of any palsy. He told us that a few days after leaving the hospital he returned to work, but within a week became ill again. He was sick at the stomach and his muscles were sore and weak. In a few days he became bedridden. The arms and legs were never very painful, only somewhat sore and tender on pressure. There was no disturbance of bladder and rectal control.

Examination. He was a clear-eyed, clean-skinned young man, presenting none of the signs of alcoholism. There was double

wrist- and foot-drop. The grip was poor. He could weakly flex and extend the forearms and by a throwing effort get his hands above his head, but he could not feed himself. He could slightly flex and extend the knees in bed, but not walk or even stand. The arms and legs were soft and flabby, but there was (on admission) no distinct local wasting. Sensibility was normal over the entire body. The cranial nerves were normal. The pupils, equal in size, responded quickly and well to light and with accommodation. The knee, biceps and triceps jerks and the plantar and cremasteric reflexes were absent. The muscles were not painful but the calves were tender when squeezed. Nerve-trunk tenderness was slight. He controlled the bladder and rectum well. His mental state, so far as could be determined in a man who talked only a little English, was good. He certainly had no marked mental disturbance, as he talked rationally and his behavior was entirely sane. He showed none of the signs of delirium or dementia. The heart and lungs were normal. By the 19th of December the muscles were much wasted, especially the extensors of the hands and feet and the intrinsic muscles of the hands. Now (February 14th) his condition remains the same. Because of the absence of all of the general signs of alcoholism and the almost purely motor type of the symptoms I do not believe he has alcoholic neuritis. It is much more probably a case of so-called idiopathic neuritis or the bronchitis may have been influenzal and the neuritis a consequence of it.

The next patient (Case III) is an example of combined nervous syphilis and alcoholic neuritis. B. D., a white woman, aged thirty years, was admitted to the hospital in February, 1904, complaining of inability to walk. She had been a heavy drinker for years and was on a spree for a month before the onset of her present illness. Almost two months before admission she awoke one morning with extreme pain in both legs and such weakness in them that she could not get out of bed. Some incontinence of the bladder and rectum appeared and her hands became weak and felt numb and dead.

Examination. She looked like an old alcoholic. Both feet dropped and the palsy of the legs was so great that she could scarcely move them. There was no wrist-drop nor indeed any marked palsy of the arms,but all movements were weak and the grip was very poor. The calves and the nerves at the knee were tender. The soles and palms hurt all the time. Notwithstanding the subjective pain and the hypersensibility to deep pressure there was insensibility to mere touch over the legs and lower part of the abdomen. There were two quite deep bed-sores on the buttocks and another on one hip. The knee and Achilles jerks were absent. She had to empty the bladder and rectum as soon as the impulse arose. The pupils were sometimes equal, at others unequal. The reaction of the irides varied. Their movements were always sluggish, but sometimes they reacted to light and not with accommodation, while at other times the reverse

occurred. Sometimes they reacted a little in response to both light and accommodation. She was a dull stupid woman of low mentality, but not insane or delirious. By March, 1904, the bed-sores had healed, the tactile anæsthesia was lessened, or rather was present only in a few scattered areas, and slight power of movement of the legs had returned. By December, 1904, she could barely go through the movements of walking when supported on both sides, the toes scraping the floor. When seated she could raise the thighs, flex and extend the knees, and move the feet a little. After sitting for a short while the feet became blue and cold and a little puffed. The arms were fairly strong and the biceps and triceps jerks were present. The plantar jerks were variable, stroking the soles sometimes causing flexion, sometimes slight extension of the toes. The variability of movement depended on the intensity of the stimulus and not on the part of the sole stroked. Bladder and rectal control had improved somewhat. By January, 1905, she could sew, could get out of a chair and stand with very little aid, but could not walk unsupported. She could move the toes and flex and extend the ankles. Sensibility was normal over the entire body. She controlled the bladder and rectum quite well but it was still impossible to hold the urine for a long time. She has now (February 1, 1906) been at a standstill for several months. There is marked foot-drop and on account of the pulling up of the Achilles tendon the heel is fixed. When supported by one hand she stands with the toes on the floor, the heels in the air. She cannot put the heels to the ground. When supported by both hands she can take a few steps on her tiptoes. There are slight contractures of the knees. Barring slight hyperæsthesia of the soles there are no sensory disturbances. All the deep reflexes of the legs are absent. The arms are normal in all respects. Bladder and rectal control is good.

The mode of onset, the complete palsy of the legs, the bed-sores, the incontinence of urine and feces, and the tactile anæsthesia not affecting the distribution of certain cutaneous nerves, but extending to a line on the abdomen, all indicate disease of the spinal cord. The muscle pain, the tenderness of the nerve trunks in their peripheral distribution, and the sensory symptoms in the arms, with but little muscular weakness, indicate multiple neuritis. The case is, of course, not an ordinary syphilitic meningitis, and I think the correct diagnosis is combined alcoholic and syphilitic disease. Cases of alleged acute syphilitic multiple neuritis have been reported, but it is so well established that the primary seat of infection of the nervous system is the pia of the brain and cord that, given a syphilitic with multiple neuritis, it is well to look farther for its cause.

The next case (Case IV) occurred in an alcoholic woman after childbirth. Whether the neuritis was entirely alcoholic or whether puerperal sepsis was also causative cannot be determined. The patient, aged thirty-five years, was admitted to the Hospital in

September, 1905, complaining of inability to walk and pains all over the body. She dated her illness from April, 1905, at which time she miscarried a six months' fœtus. During the latter part of her pregnancy she felt ill and tired all the time, but with no well-defined symptoms. Two weeks after the miscarriage she rapidly grew worse and was seized with severe cramps and pains in the legs. They and the arms also felt stiff. She stopped walking about a month later.

Examination. She was a poorly nourished, middle-aged woman. She could not stand and both feet dropped. Even when in bed she could scarcely move the legs. The wrists dropped slightly and all movements of the arms were weak. The bladder and rectum were well controlled. The calves were painful and the nerve trunks from the knees down were very tender. The hands were numb. The calves, hands, and extensors of the wrists were much wasted. The knee, Achilles, biceps, and triceps jerks were absent. There was no disturbance of function of the cranial nerves except that the pupils reacted sluggishly. The lungs were normal. The heart sounds were weak, but there was neither valvular disease nor hypertrophy. By the middle of October she was able to use the hands well and numbness had much decreased. Pain and hyperæsthesia continued in the legs. The soles were especially sensitive. Now (January 26, 1906) she can flex and extend the knees in bed, lift the legs an inch or so from the mattress, and abduct and adduct the thighs slightly. Foot-drop persists. Both great toes drop. The proximal phalanges of the other toes are extended and the distal flexed. She uses the arms well. The soles are still very sensitive. There are no sensory disturbances in the arms. The deep reflexes are still absent. Her mental state at the beginning of the illness is unknown but since she has come under observation it has been normal. She states that her memory is not as good as formerly, but she remembers well the daily events in the ward.

In Case V a local pressure palsy occured, at the time of onset of the general neuritis, and the knee jerks were preserved throughout the entire illness. The patient was a woman, aged thirty-three years, who had suffered much, sinned much, and drank much. She was brought to the hospital in January, 1905. She stated that early in the month she had begun to feel sick, had headache, fever and chills, stiffness in the joints, cramps in the calves at night, and pain in the feet and hands. She took even more whiskey than usual, and while she was stupid from liquor her husband lay for several hours on her right arm. Next morning she could not get out of bed because her legs were too weak and painful, and could not use the right arm, which was swollen.

Examination. She was a fat, flabby woman with an alcoholic face. The feet dropped. She could weakly move the legs in bed but could not stand. She weakly flexed and extended the right

forearm, but could not hold the arm up unsupported. She could not extend the wrist beyond the plane of the forearm and could not further flex the already partly (paralytically) flexed fingers. The hand and arm were somewhat swollen and pitted on pressure. Examination of the axilla revealed no cause for vascular obstruction. She could move the left arm freely, but weakly, in all directions. There was marked loss of power in extending the wrist against resistance. The grip was poor. The biceps jerk was absent on the right and present on the left side. The little finger of the left hand and the adjacent side of the ring finger as well as the ulnar side of the palm and the back of the right hand were anæsthetic to touch and temperature. There was no anæsthesia in the legs, but some pain and, on pressure, tenderness. The right leg and foot were somewhat swollen and pitted on pressure. There was never œdema on the left side. The cranial nerves were unaffected. The knee jerks were increased in amplitude but not spastic. Ankle clonus was not present. The plantar jerks were normal. The Achilles jerks were present. The right pupil was larger than the left, and when exposed to light contracted slightly and then dilated. The left reacted normally to light and both with accommodation. Throughout her illness she retained control of the bladder and rectum. She had chronic nephritis. In the middle of March she was discharged practically cured, but though the right grip was strong, flexion of the fingers of the left hand was weak and tactile anæsthesia of the ulnar distribution of the left hand persisted.

Case VI shows the influence of pneumonia in causing a recrudescence of pain and palsy. The patient, a woman, aged thirty-six years, was brought to the Hospital in June, 1905, complaining of pain and swelling of the feet and legs and shortness of breath. She had been a heavy drinker for years, and during the last eight had had occasional epileptic attacks. She became ill about three weeks before coming to the hospital.

Examination. Her face was pallid and bloated and the legs œdematous. She could not stand alone. Sensibility to pain was lost in the left foot and thigh and in the entire right leg. The left calf was less sensitive to pain than normal. She complained of prickly sensations in both legs below the knee. Sensibility to temperature was lost in the right foot. The knee, Achilles, and plantar jerks were absent. The popliteal spaces were very tender to pressure and the calves hurt continuously. The pupils were equal and reacted well. The lungs were normal and there was no valvular heart disease. The urine averaged 1008 in specific gravity and contained traces of albumin and a few hyaline casts. Soon after admission she had three epileptic convulsions in one day (the only ones she has had while in the hospital), after which she was violent for one night and stupid and dull for several days. By July 17th there was complete wrist-drop on the right and partial on the left side. All other movements of

the arms, save those of extension of the wrists, could be made, but weakly. Sensibility to pain and touch was much diminished in the hands and forearms. The muscles of the forearms were soft, flabby, and somewhat atrophied. The œdema of the legs prevented the determination of wasting in them. By November, 1905, she had improved considerably. The wrist-drop had disappeared, but she could not dorsally flex the feet. Pain had ceased in the arms but continued in the legs. By December the œdema of the legs had gone and the calves were seen to be wasted. On January 3d she was seized with a right sided pneumonia from which she is now (February 9th) convalescing, but which caused an increase or rather recurrence of her nervous symptoms. Pain in the hands and extreme tenderness on pressure over the nerves of the arms returned. The soles were painful and sensitive. Anæsthesia did not recur in either the arms or legs. She could not move the toes or feet and only weakly extend and flex the knees. The wasting of the calf muscles increased quite a great deal. She never had any of the symptoms of Korsakoff's psychosis. The only mental symptoms were excitement followed by stupor after the epileptic fits and mental hebetude during the pneumonia. At the present time she talks and behaves like an ignorant and rather stupid but fairly sensible woman.

Case VII shows very well the typical mental symptoms. The patient, a married woman, aged thirty-seven years, was admitted to the hospital in October, 1905. She was so confused that her account of her illness was worthless. About four weeks before she had begun to be ill with headache, nausea, and vomiting. About a week later she began to complain of pain and tenderness in the legs. She had been a heavy drinker for a long time.

Examination. She was a fairly well-nourished woman, with the alcoholic face. Both feet dropped and she could not stand alone. The legs were painful and the soles were very sensitive. The knee and Achilles jerks were absent. The plantar jerk was normal. Sensibility and motor power were good in the arms. Several weeks after admission the calves were distinctly and the thighs somewhat wasted. She never lost control of the bladder and rectum. The left pupil was a little smaller than the right, both responded promptly to light and with accommodation. There were no cranial nerve palsies. The heart and lungs were normal. After the wasting in the legs appeared the knees became fixedly flexed on the thighs at about a right angle, and any attempt at passive movement caused severe pain. For a time there was marked hyperæsthesia of the skin of the abdomen and chest.

Her mental state was interesting. When no one spoke to her or disturbed her she lay quiet and speechless, paying no attention to anything and at night sleeping well and taking food without trouble. When talked to she became very much confused, fabricated, mixed past and present, had no realization of being ill, was garrulous, and

sillily happy, did not know where she was, and recognized old friends in the nurses and doctors. She was sometimes very plausible in her talk, *e. g.*, when told she was in a hospital she replied, "Oh, yes, I came out this morning to see my aunt, but of course I am not a patient." She frequently said she had been out walking with her children or visiting in the morning. She was convinced her mother and children had been to see her and related conversations she had with them. Fancy and fact were inextricably mixed in her daily life and ten minutes after a meal she would declare she had eaten nothing for hours and any bystander was liable to be recognized as a relative and talked to as such, being told incidents, which may or may not have been true, which happened long ago. She was never violent, excited, peevish, or querulous, but always sillily happy. Her mental condition remained unchanged till the beginning of February, when in the course of three days all psychical symptoms improved and she became fairly normal. Now (February 8, 1906) her condition is as follows. Both legs are stiff at the knees. There is no foot-drop, and she moves toes and ankles well, but cannot stand, partly because of contractures, partly because of weakness. The only sensory symptom is hyperæsthesia in the soles. There is quite marked atrophy of both calves, slight on both thighs.

Case VIII also showed characteristic mental symptoms, and is interesting because of the microscopic changes found in the brain. The patient was a woman, aged forty-five years, who had used alcohol to excess for many years. She had been ill for about three weeks previous to her admission on March 2, 1905. She complained of pains in the arms and legs, but could give no clear account of her symptoms.

Examination. She was fat, blear-eyed, and middle aged. She could walk weakly for a few days after admission, but soon became bedridden. She could move either arm in all directions, but both were weak especially the right. There was no distinct wrist-drop. There was great loss of power in the legs, but not great foot-drop. The knee and Achilles jerks were absent; the plantar reflex normal. The biceps and triceps jerks were present. Pressure over the nerve trunks in the arms and popliteal spaces caused pain and the calves were sore. There were no cranial nerve palsies. The right pupil was a little dilated. Looking to the left caused slight lateral ataxic movements of the eyeballs. There was no oculomotor palsy. She had good control of the bladder and rectum. So far as could be determined there was no anæsthesia in the arms or legs. She was much confused. When she first came to the hospital she realized that she was ill and told us, what was not true, that she had broken her wrist and leg by falling a few days before. She did not have the power of imagination of the last patient and did not fabricate so much or so interestingly. After a few days she ceased to realize that she was ill and took it as a matter of course that she should

stay in bed because she was told to do so. She did not know that she was in a hospital, but thought she was in a private house. She paid no attention to her surroundings, and when it was pointed out to her that there were a great number of people in bed for a private house she did not trouble herself about the incongruity of it but simply restated that it was a private house. The nurse she mistook at times for one old friend, at others for another. She had no idea of the passage of time and said sometimes she had been in the hospital three months, at others a couple of weeks. Her memory for both old and recent events was very bad. She could understand a short, simple question and would obey simple commands, but when talked to soon began to wander. About March 10th fever (103° F.) began; she became stupid and congestion of the lungs and later left lobar pneumonia developed. On the 19th she became unconscious and died in a few hours. The necropsy revealed pneumonia, myocarditis with dilatation, chronic diffuse nephritis, and fatty liver. On gross examination the brain and cord appeared normal. Through an oversight none of the peripheral nerves were saved.

Dr. C. D. Camp kindly made a microscopic examination of the brain and cord. Sections from both paracentral lobules showed the pia somewhat thickened but no infiltration with round cells. The bloodvessels of both the pia and cortex were distended with blood and their walls slightly thickened. There were a few amyloid bodies in the cortex just beneath the pia, but no marked proliferation of the neuroglia. The Betz cells, stained with thionin, were swollen, globular, and had lost some or all of their processes. The chromophilic elements stained as a very finely granular mass. The nuclei were centrally located in most of the cells. The cells were deeply pigmented, but probably not more so than is normal in a person of her age. The cervical cord, stained with hæmalum acid fuchsin, showed an apparent increase in the number of bloodvessels probably due to the thickened walls. They were especially well marked in the posterior columns. The anterior horn cells were densely pigmented. The lumbar region stained with the hæmalum acid fuchsin, resembled the cervical. Capillary fibrosis was even more marked. The anterior horn cells, stained with thionin, were much pigmented. The chromophilic element was finely granular and stained feebly, and the nuclei in many cells were visible by the Weigert hæmatoxylin method. A sympathetic ganglion from the lumbar region showed the following condition: The nerve cells much pigmented, and many of them were simply masses of pigment containing no nuclei, in others nuclei were present, but stained faintly with hæmalum fuchsin. There were several microscopic masses of small round-cell infiltration of the connective-tissue sheath of the ganglion. The myelinated nerve fibres passing through the ganglion were small in diameter but normal. It is, of course, too early to speak dogmatically of the morbid anatomy of the mental symptoms occurring in

multiple neuritis, but the changes found in the cortex are of interest. The significance of the changes in the sympathetic ganglion is unknown.

CASE IX is interesting because it is a second attack and because the mental symptoms came on while she was under observation. The patient was a white woman, aged thirty-seven years. She had been a drinker for many years. She was admitted to the hospital in October, 1905, complaining of pains in the legs and arms. There was nothing of importance in her history, save that she had had an attack of acute alcoholic neuritis, and recovered, a year ago. The illness came on only three days before her admission with aching in the ankles and soon after weakness in the legs, so that she often fell when walking.

Examination. She was a large well-nourished woman, with a distinctly jaundiced hue of the skin and conjunctivæ. There was no distinct foot-drop, but dorsal flexion of the feet was impaired. The legs were moved well in all directions. There was no wrist-drop and hands and arms were well used. The muscles of the legs and hip were painful on pressure and the popliteal spaces tender. The knee jerks were absent. There was no anæsthesia of the arms or legs. The pupils reacted well to light and with accommodation and there was no ocular palsy, but when looking to either side a coarse nystagmus appeared. The bladder and rectum were well controlled. There were signs of mitral valvular disease. The liver appeared slightly enlarged, but there was no evidence of a dilated gall-bladder. Both ankles were somewhat œdematous. Seventeen days after her admission mental symptoms came on quite suddenly. She said she had been in the hospital a day and a half and that the night before she had slept in another ward. By this time also some atrophy had appeared in the extensors of the hands and feet and she had become somewhat emaciated. Dates, places, and things were mixed and fact and fancy mingled together. At the same time the pain in the legs increased and the arms began to hurt. Soon after the knees became stiff. Now (February, 1906) both legs are stiffly flexed at a right angle to the thighs and any attempt at passive movement causes pain. There is no foot-drop. Both knee jerks are absent. The soles are exquisitely sensitive. There is no anæsthesia. The calves and thighs are very sensitive to pressure. Pressure over the nerves at and below the knee causes pain. There is no anæsthesia of the legs. The arms are normal in all respects. She realizes where she is and that she has been sick. Memory for past events is much better and is somewhat better for things of to-day, but she is a little demented. She laughs foolishly and behaves much like a child.

In Case X alcohol and lead were joint causes. The patient, a man, aged twenty-seven years, was admitted to the hospital in August, 1903, complaining of slight pain in all his extremities and

inability to move his arms or legs except the fingers of the left hand. He had worked in white lead and been a heavy drinker for a long time. His illness began about three weeks before admission. The onset was rather slow, extending over several days. The first symptom was headache followed by weakness, first in the right wrist, then in the left, and lastly in the legs. There was some pain.

Examination. He could neither stand nor walk. He could flex and extend the arms a very little. Wrist- and foot-drop were present on both sides. There was marked wasting of the muscles of the hands, the forearms, the arms and shoulders. The legs and buttocks were wasted some but not so much as the arms. All the deep reflexes were absent. He controlled the bladder and bowels well. Sensibility was normal on the legs and arms. There was a distinct blue line on the gums. The cranial nerves were normal. The feet became blue and cold when they hung down. Pressure over nerve trunks in legs and arms caused pain. Now (February, 1906) he still is unable to walk and is much wasted. He can flex and extend the legs upon the thighs and the thighs upon the abdomen, and can move the arms a little. There is no wrist-drop, but foot-drop persists. He suffers no pain. His mental state is normal.

ACUTE PARANOIA EXHIBITING CYCLICAL RELAPSES.[1]

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This is the record of a case in a male in which there was a monthly vasomotor disturbance coincident with the relapse.

I would lay emphasis upon the patient's family history and occupation. The trail leading up the attack itself is clearly blazed: family taint; stress and strain of responsibility too much for mental material; too much "social life;" the inheritance from one side of a capacity for virile ambitions and the desire for achievement—on the other, a lack of the ability to stand the strain that the necessary effort demanded.

Mr. J.'s age was twenty-four years in June, 1903—the date of the onset of this attack. He is unmarried and was engaged in a manufacturing business.

Family History. His father is possessed of a strongly fibred mentality and a robust constitution. His mother was never very strong and has been an invalid for years. She has suffered from diabetes and is of frail make-up. Her mentality is good but not

[1] Read before the Philadelphia Neurological Society.

robust. One sister had an attack of acute mania some years ago consequent upon severe mental stress—she has completely recovered.

Previous History. As a boy the patient was fat, good tempered, normal; he always did well at school and was considered quite bright, though not precocious. When his preparatory school days were over he went through college without incident. In his relations toward the opposite sex he tends to idealism, has been susceptible to a high degree, but has never made himself foolishly conspicuous in this respect, and has always been considered "artistic." He never was conscious, heretofore, of abnormal ideas and entered into all the social and out-door life of his fellows. He did well in his business life and was promoted quickly; has always been healthy and never had his attention called to any mental lapse whatever, up to June, 1903.

I would lay stress upon his occupation, believing it to be one of the chief causative factors in this case: he was placed in charge of a new department in a big business, knowing little of the theoretical or practical sides of it, but having an ambition to make it a success. His social life enforced upon him its late hours and other burdens: he was "burning the candle at both ends." There is no history of alcoholism or specific disease.

Present Illness. Mr. J. came to me June 18, 1903, complaining of mental confusion. For several days he had had, as he expressed them, "nutty ideas." These were found, on close questioning, to be a distortion of normal ideas rather than any delusional concepts. He said that he would sit for a long time without saying anything, and explained it on the ground that he was not sure of himself. There were no hallucinations whatever. The confusional element showed itself in the inability to connect individual ideas into normal sequence. There was no confusion whatever as to time, place, personal identity, etc. He talked quite rationally and complained that he was beginning to lose the ability to write letters and attend to his business. In addition to this he complained of cerebral distress as of great tension inside the head; expressed a fear lest his actions be peculiar and noticeable, for he realized that his thoughts and feelings were not normal. He never noticed a similar condition prior to this, and was positive that this had lasted but a few days and said it was growing unbearable, but did not see how he could possibly give up his work. He said he was harassed by insomnia. His bowels were habitually constipated.

Physical examination showed him to be under weight, his weight being only one hundred and thirty-six pounds, while his height was five feet ten and a half inches. His musculature was good, but the skin was muddy and showed a lot of little pustules on the face and body. The tendon reactions were normal. His tongue was quite coated, his breath offensive, and his eyes bloodshot.

Nothing abnormal was noted as to heart, lungs, and abdomen.

Urine examination showed no abnormality.

His father was warned of an approaching mental disturbance of considerable severity and probably long duration. A course of treatment was instituted and the patient kept under strict observation. For a time he got better—or rather felt better. He received no letters and wrote none; did not care to read, but thought he ought to read the Bible. As he felt better the eyes became less bloodshot, and brain tension disappeared; he felt brighter and but little confused; he enjoyed the routine of his treatment and life and said he thought he would soon be able to resume his work. Nevertheless, any mental work tired him and he felt unable to fix his attention on any subject—even the newspaper—and said he could not follow any one line of thought.

This period of betterment lasted about two weeks, when it was noticed that he began again to be preoccupied and quieter than usual. His eyes became reddened and watery looking, and he would laugh in a silly, explosive way without cause, and immediately after compose his features in the attempt to fix his mind on what was going on. Unless he was aroused he would sit for a long time gazing fixedly. He soon exhibited marked delusional ideas, *e. g.*, his father might be cheated in business; he himself was noticed by passers-by, and their conversation was directed at him, etc.

This was annoying but did not worry him excessively, because he reasoned that they had no cause to dislike him or do him harm. He said that this made him quiet because if he talked they might misunderstand him, etc.

The inability to sleep returned. It was noted that he passed larger quantities of urine than at first. His weight had increased somewhat, but now remained stationary.

He could be made to understand that his delusions were such and it quite relieved him to know it, nevertheless the abnormal ideas would persist. He was neither melancholic nor maniacal, though he was passively unhappy and depressed. Relapse came gradually, taking several days to reach its height; it remained about the same for a few days and then began to subside. The subsidence was quicker than the rest of the relapse—the whole time being about twelve to fourteen days. After it there came a period in which he felt very much better in every way—reaching a higher level than in the preceding period of betterment. During this period he wrote a letter to his family which was normal in every way. But when questioned closely he said there still remained a taint of vicious ratiocination—though he was better able to overcome it by reasoning. Toward the end of the first relapse after the first onset he was sent on a travelling trip with an attendant. A second relapse came on like the first, lasted about as long and ended in the same way. The delusions were similar—being that the people near him were talking about him and discussing his mental condition. At this time he

thought the attendant was attempting to play a joke on him and was trying to distort his (the patient's) words, etc.

It was not until a third relapse that the periodicity of the attacks was realized fully and future relapses predicted with some exactitude as to time. At this time his family was notified of the situation and a prognosis given conditional upon a certain course of treatment. The course of the relapses was now about as follows: Outward signs; patient preoccupied and distrait; eyes bloodshot; personality changing from normally friendly to reserved and finally to suspicious; facies at first dull and expressionless, afterward satyric and smirking, the patient giving way to silly bursts of laughter that were quickly suppressed. Mental signs: acute self-consciousness; intense egotism; fear of doing and saying the wrong thing; suspicious of innuendo and hidden meanings; at times thinking that people about him considered him vain, stilted, and hypocritical—at these times he was uncertain whether to resent the (supposed) remarks about him, yet hesitated to do so because he feared he would be misunderstood in that also.

The course of these relapses was about ten to fourteen days and ended rather abruptly.

I wish to emphasize the absence of hallucinations, melancholia, and mania; the fact that between relapses there was never a time when he was absolutely free from the taint of delusions; that between relapses his personality, facies, and mental exhibitions were radically different from what they were during the relapse; that there were no signs of catalepsy, no true dementia, although the silly expression and explosive laughter were looked upon as danger signals; *especially* that each relapse was ushered in and continuous with marked vasomotor disturbance, viz., overfilling of the cranial bloodvessels shown so plainly in the eyeballs, and suspected in the kidneys, because of the large quantities of urine voided during the relapse.

The course of the illness lasted from June 18, 1903, to June 23, 1904. During this time there were ten relapses, inclusive, as follows:

June 18th to 28th, July 20th to 31st, August 25th to September 5th, September 23d to October 4th, November 12th to November 24th, slight; December 20th to January 16th, bad; March 17th to 26th, April 2d to 10th, May 23d to June 2d, June 13th to 19th, since June 22d no symptoms.

Such is the record of a single case. The special interests that attach themselves to this one arose from the fact that in part it resembled such psychoses as dementia præcox, periodic insanity, and acute paranoia.

Before attempting a differential diagnosis I will give as typical the notes taken at the time of the March relapse and likewise of the last one that occurred—the second June relapse of the series:

"*March* 17th. Mr. J. has begun to show signs of coming relapse. For last few days has been preoccupied. Today somewhat confused. Eyes bloodshot.

"18th. Begins to show mental irritation. Is suspicious and sensitive. Says attendant is 'throwing dust in my eyes' (meaning by this that he has some hidden meaning attached to his words). Is headstrong and if opposed thinks it is because it is desired to humiliate him.

"19th. Still very sarcastic and suspicious (in his attempt to resent and parry supposed shafts of sarcasm—though absolutely nothing was said to him except the most ordinary remarks)."

This relapse lasted until the 26th, on which day he was free from the mental confusion, suspicion, and cross delusions. Notes say: "Eyes no longer bloodshot, sleeps better and feels much better. When closely questioned says he realizes that the relapses are abnormal and even during them he has begun to re[illegible]ze that it is a relapse and will pass. Says he is almost free from any t[illegible]nt between relapses."

The notes of the next relapse are as follows: "June 15th, returned from ——— this afternoon. While there had a return of abnormal ideas. Thought total strangers were talki[illegible] about him, etc.

"*June* 16th. About the same. Preoccup[illegible] and distrait.

"18th. Talked freely about his condition; [illegible]id he felt he was doing right but that accusing thoughts came to him. Considerably confused in his ideas. Eyes bloodshot.

" 19th. Was made to appreciate that he must realize the abnormality of his present state. Cautioned not to lay stress upon the foolish ideas. Said he felt better for having talked over the matter.

"20th. Ideas clearer. Is somewhat depressed in spirits, but not confused. Says he feels 'blue,' but not entirely cast down. Is not disheartened.

"22d. Has no delusions and can talk of past depression quite sensibly. Says he can look back on it and remember all the details. Realizes his former state of mind pretty well. Expressed wonder at the possibility of such ideas possessing him."

That is the end of the record—except that since then (June 22d) there have been absolutely no abnormal symptoms. Patient weighed one hundred and seventy-six pounds when I last saw him (a gain of forty pounds), and had never been better.

This case resembles certain forms of dementia præcox.

I had under my care a few years ago a case of hebephrenia in a girl sent me by Dr. Wharton Sinkler. It will be referred to as Case A. About the same time I had another ease of dementia præcox of the paranoidal type in a young man which will be referred to as Case B. Both cases had a marked resemblance in some of their characteristic symptoms to the case under discussion, likewise marked differences.

In Case A there was the same confusional onset: change of

personality, preoccupation followed by silly explosive laughter and accompanied by vasomotor disturbances; acute symptoms ending comparatively suddenly and followed by a period of betterment. There were no fixed delusions noted—but rather a change from mental confusion to a depressed state and then to the silly stage when she was possessed with foolish ideas, sometimes expansive, sometimes obstinate and destructive; after this almost invariably came a mental storm at times maniacal in its fury—and then the period of betterment. All symptoms were exaggerated during the menstrual period.

There was a record in this case of repeated attacks followed by recovery, but ending ultimately in dementia.

In Case B there was preoccupation, mental confusion, a like vasomotor disturbance, silly, explosive laughter, satyric facies, etc., but their exhibition was not manifested in the same sequence or degree. In addition there were expansive ideas, marked delusions of various kinds and deep seated; also a period of mania; later there were marked dementia symptoms, *e. g.*, drooling of saliva, inability to articulate, failure to recognize anyone, and for more than a week could not make the efforts required during deglutition; then a cataleptic state with fixed stare, etc. This man progressed gradually but surely along the difficult road to a complete recovery.

Now, in contradistinction to these fairly typical cases of two distinct types of dementia præcox the case under discussion presented the clinical picture of cyclical relapses foretellable both as to time and as to length; no evidence of mania; the dementia symptoms never going beyond the danger signal stage. There never was a time from first to last when one could say there was no mental taint, yet the periods between the relapses were such that many people who were quite intimate with the patient never realized his condition, having seen him only between relapses.

Inasmuch as it presents the "periodic expression of a similar set of symptoms" it bears a close resemblance to the idiopathic periodic insanities of Kraft-Ebing, except that there were no periods of complete recovery. It is not a circular insanity, inasmuch as there was exhibited neither melancholia nor mania.

Kraft-Ebing speaks of a periodic hallucinatory insanity that very closely corresponds to this one in the sequence of its expression, except that this case is a de usional form and not hallucinatory.

The difference r sts upon the fact that there is no period of recovery during the course of my case.

Neftel publishes a case of recurring melancholia in which there was vasomotor spasm. He considered the melancholia due to the resulting anæmia.

In my case there were recurring relapses with vasomotor dilatation. Were the relapses due to the vasomotor disturbance or were they synchronous symptoms?

Meynert considers that over-filled cerebral bloodvessels are a

cause of mania and that the mania of circular insanity is due to such over-filling. In my case there was distinct over-filling but no mania. Kraft-Ebing rejects Meynert's theory.

Finally we come to acute paranoia. While Kraft-Ebing does not recognize such a condition but confines himself to the statement that the distinctive feature of paranoia is its chronicity, yet his description of certain forms of paranoia correspond quite fully to this case of mine—minus the chronicity.

Kraeplin, however, considers acute paranoia an intermediary disease between chronic paranoia and the emotional psychoses (mania and melancholia). Meynert pointed out especially the fact that in all these psychoses the characteristic traits are a condition of confused consciousness and a difficulty of orientation; he applied the term confusion to the whole group of these diseases and did not include chronic paranoia. No distinction was made between acute mental confusion and acute paranoia.

One writer commenting on acute paranoia says its most noticeable sign is the delirious relation of the patient to his surroundings.

Schuele says it is characterized by the fixed nature of the hallucinations and delirium, the condition of consciousness playing an unimportant part here.

In the diagnosis of a disease the symptoms are a measure of certain values. In this case the symptoms indicate a form of insanity, characterized by mental confusion and delusions of a persecutory character, in the course of which relapses presented themselves in distinct monthly cycles accompanied by marked vasomotor disturbances.

I fail to find in the text-books and other literature I have examined a case presenting a similar set of symptoms.

I incline to the diagnosis of acute paranoia exhibiting cyclical relapses.

NOTE. — May 21, 1906. The patient continues in excellent health, with no return of abnormal symptoms.

THE BREUS HÆMATOMMOLE.

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FROM the time when Breus, in 1892, in a monograph entitled *Das tuberöse subchoriale Hæmatom der Decidua*, first described this as a distinct form of mole pregnancy there has been the widest difference of opinion on the part of those who have interested themselves in its investigation. At first these men were loath to accept this mole as a separate and distinct form, and two writers, namely,

Neumann and Mirabeau, have attempted to classify it with the blood moles. There have been in all about thirty-five cases of this rare mole reported by various writers and while most of them now agree with Breus in its existence and chief gross characteristics, they are still far from agreeing as to the histological changes and the underlying causes of its peculiar form.

In his monograph Breus,[1] while reporting five typical cases of this form of mole, describes the cardinal characteristics as follows:

1. That there is a marked disproportion between the size of the embryo and that of the ovum, and also a marked discrepancy between the apparent ages of both ovum and embryo, as determined by their size and development, and the period of pregnancy, as obtained from the history of the case. In the most striking of Breus' cases the patient had given a history of pregnancy of eleven months' duration, while the ovum expelled had merely the size of a three months' pregnancy and the embryo had a length of merely 1.5 cm.

2. There is an absence of any circulation between the fœtus and the placenta; that is, there is an absence of bloodvessels in the chorion.

3. The presence on the inner or fetal surface of the placenta of hæmatomata which, covered with amnion and chorion, bulge into the cavity of the ovum. Breus laid special stress upon the form of these hæmatomata, which were in his cases often lobulated and here and there had such constricted bases as to become almost pediculated. He explained their formation by an outpouring of blood from the decidual vessels into preformed sac-like folds of the chorioamnion, and thought that this folding was brought about by a disproportionate growth of the membranes after the death of the embryo, at the same time claiming that in the death of the embryo lay the ultimate cause of all.

Shortly afterward Walther[2] reported a similar case in which he agreed with Breus in all essentials and at the same time attributed the growth of the membranes after the death of the embryo to an endometritis, by which he thought the membranes were better nourished than usual and thus stimulated to a more rapid growth.

Contrary to these two views, Neumann[4] denied any growth whatever of the membranes after the death of the embryo, and far from attempting to explain the development and form of the mole, claimed that it was identical with the ordinary blood and carneous moles. To substantiate his theory, Neumann reported ten cases, some of which were certainly blood moles, but had, however, none of the characteristics of the Breus mole. In these cases the embryos varied in size from that of two months to that of a six months' fœtus, and only two showed a disproportion between the size of the embryo and that of the ovum. Furthermore, none of Neumann's cases showed the characteristic lobulated forms of hæmatomata

which Breus described. Contrary to Breus, Neumann claimed that the hemorrhages were primary and that the death of the embryo followed later, that by the hemorrhages the chorioamnion was forced out mechanically. He also held that the bleeding could come from the vessels of the chorion as well as from the decidual vesselsf, or in most of his cases the vascularization of the chorion had reached an advanced stage. Later, Mirabeau[17] took a similar stand with Neumann, while all of the other writers on the subject have agreed with Breus in the essential characteristics, putting these moles in a distinct class and only differing from each other in their explanation of the underlying causes. Thus, Gottschalk,[5] while agreeing with Breus that there was a folding of the amnion and chorion leading to the formation of sacs into which there was a subsequent flow of blood, attributed the ultimate cause to an insufficiency of the primitive heart formation of the embryo with a consequent lack of circulation between it and the placenta.

Davidson,[7] while reporting two cases, denied any growth of the membranes whatever after the death of the embryo and explained the disproportion between their sizes by the presence of hydramnios at an earlier period in the course of the pregnancy, the fluid having been absorbed later on, thus leaving a considerable diminution of pressure within the sac and a consequent tendency to an inward bulging. In this Taussig[8] agreed with Davidson on purely theoretical grounds.

The latest writer on the subject, Bauereisen,[18] again turned toward the theory first held by Walther and found an endometritis which he held as the ultimate cause of the Breus mole, while declaring the direct cause of the formation of the hæmatomata to be the stoppage of the outflowing blood by detached chorionic villi which pressed on the veins of the decidua. He at the same time suggested the name "Aneurysmamole" as more appropriate than that of hæmatommole, on the ground that the protuberances were dilatations of blood spaces rather than extravasations of blood.

The following case, although in a very early stage of its development, seems to show some of its essential characteristics more clearly than the more advanced cases in which the early features of the formation are overshadowed or lost sight of entirely in the completely developed mole.

The case is from the clinic of Professor Chrobak, in Vienna, to whom I am indebted for the privilege of studying and reporting the mole.

The patient is a primipara, twenty years old, giving no history of any previous illness. The menses were always regular every three weeks after the sixteenth year. The duration was as a rule three days. The cessation of normal menstruation was July 26th, although three weeks later, August 17th, there was a scanty flow. In the middle of November there was again a slight bleeding, but

simply for one day. On December 18th labor pains began which after about five hours' duration resulted in the expulsion of the ovum and embryo, accompanied by considerable bleeding. A thorough examination of the uterus was made immediately after the admission of the patient to the hospital, but no traces of retained membranes or placenta were found. The temperature on admission was 37.4°C., and afterward remained constantly below 37° C. There was rapid and good involution of the uterus and the patient was discharged in one week. There were no evidences whatever of endometritis.

The ovum is covered over about one-third of its outer surface by a well-formed placenta which measures 5 x 5 cm. and varies in thickness from 0.4 to 0.8 cm. The maternal surface of the placenta is for the most part of a pale grayish color and smooth, with the exception of slight markings of the primitive cotyledons. The remaining two-thirds of the surface of the ovum is smooth and entirely devoid of decidua reflexa, except over a small area 2 x 0.8 cm. continuous with the placental border, forming as it were a primitive placenta succenturiata. Over this area the membrane is about 2 mm. thick and on its outer surface portions of decidua reflexa are attached. The chorion is apparently slightly thickened. The amnion appears as a thin delicate membrane entirely separated from the chorion over its entire surface to the insertion of the umbilical cord and apparently is not thickened.

The cord, 25 mm. in length and about 1.5 mm. in diameter, has a slightly eccentric insertion into the placenta and is of a dull grayish color. To its end is attached a poorly developed but fairly well-preserved embryo which has a length of 21 mm. The embryo shows little or no curving The eyes are quite distinct. The mouth is just to be made out. No trace of the ears can be seen. Three pairs of branchial arches can be easily made out, the upper pair of which has just united in the median line below the mouth while the two lower pairs are widely separated. The upper extremities appear merely as buds, on the right of which a slight furrow marks the beginning subdivision into hand and arm. The lower extremities appear as mere buds and no subdivisions can be made out. The abdominal and thoracic cavities are not completely closed in. Thus the embryo represents, in all probability, an age of between five and six weeks.

The chief interest, however, lies in the inner surface of the placenta, over which are scattered numerous protuberances, varying in size and shape, of a dull reddish color and projecting into the cavity of the ovum (see figure).

These protuberances are everywhere covered by a smooth membrane, the chorion. The smaller ones, not more than 2 mm. in diameter, are perfectly round, while the larger ones have an irregular distinctly lobulated form. They are especially large and abundant

near the insertion of the cord. In one part a prominent ridge is seen running from the region of the cord and dividing into two branches to unite with two of the protuberances giving a distinct stem-like appearance. Between the distinct and well-marked protuberances the surface of the placenta is uneven and irregularly elevated in places. Over that part of the chorion to which portions of decidua reflexa remain attached are also some very small, slightly elevated nodules of a dull reddish color, similar in appearance to those found over the placental region. On section these protuberances appear as homogeneous, red, partly organized masses of blood, covered on their surface by a strong membrane, the chorion, which is intimately attached to it. Under the blood mass is a layer of paler

Hæmatommole. View of the internal surface of the ovum, showing the hæmatomata and the embryo.

decidual tissue. Section in one part shows an even round hæmatoma almost entirely buried in the placental tissue and not protruding enough to be visible above the surface. This furnished an interesting contrast to the theory originally held by Breus that the hæmatomata were preceded by the formation of sac-like dilatations of the chorion and showed that in some cases at least distinct hæmatomata of a considerable size may be formed without any elevation of the chorion whatever.

Sections made of various parts of the mole, including various hæmatomata, the central portion with the insertion of the cord, also of the cord itself, and of parts of the peripheral membranes, show the following:

The amnion is seen to consist of the normal one row of low epithelium and under this of a thin layer of loose connective tissue with comparatively few long spindle-shaped cells. No thickening of

the amnion is observed. There are no vessels whatever in the amnion.

The chorion over the surface of the placenta and also the chorion læve are apparently of about the normal thickness and in places show a very slight tendency to folding. The epithelium is intact and everywhere consists of a complete row of syncitium, while the Langhans cells only in a few places form a complete row, and for the most part are either wanting entirely or only seen at varying intervals. The connective tissue of the chorion is about normal in amount and shows a fibrillary construction with long spindle-shaped cells.

Extending down from the superficial chorion as far as the decidua the primary villi are seen as thick, strong ingrowths of the chorionic connective tissue covered with the same epithelium as that of the superficial chorion. A very noticeable feature is that nowhere can any traces of bloodvessels be found in the villi. The primary villi run for the most part in a fairly straight course and show comparatively little tendency to branching. In one place, near the insertion of the cord, one of these primary villi lies flat along the under surface of the superficial chorion, which it elevates slightly, giving the appearance of the stem-like formation described in the gross examination. This, while evidently having had at first a diagonal course, gives the impression that it had been forced up against the surface by some pressure from beneath, and also that it had played no role in the general formation of the placenta.

The protuberances themselves are made up almost entirely of blood in a more or less advanced stage of organization while there is occasionally seen a trace of a dead villus embedded in this mass. Although the villi are more numerous below the general level of the placental surface there is everywhere a very marked scarcity of secondary villi and those present are in a marked stage of degeneration.

Upon careful examination of the secondary villi a striking feature is the condition of the epithelium which, over the best-preserved villi, consists of but one complete row, and this in places is very low and in others entirely absent. It is noteworthy that over the part of the villi devoid of epithelium there is a deposit of fibrin, and the villi, entirely devoid of epithelium, are seen entirely embedded in fibrin, while around those with intact epithelium there is free uncoagulated blood. Some beautiful examples are seen of villi only partially devoid of epithelium on which there is a heavy deposit of fibrin over the denuded area alone, while the remaining part floats free in the blood. These areas show the similarity between the epithelium of the villi and the endothelium of the bloodvessels in their function of preventing a coagulation of the blood which flows over its surface, a fact very important in the early formation of the placenta. Bauereisen evidently referred to these deposits

of fibrin, which in places reached a considerable size and contained numerous villi, when he said that in places there was an appearance not unlike that of the white infarction of the placenta. Since they have nowhere traces of vessels the villi themselves, thus surrounded by fibrin, are cut off from their only source of nutrition, namely, absorption from the intervillous blood space, and are found in various stages of necrobiosis, so that in some areas they are scarcely to be recognized as villi. By this process a large part of the secondary villi have been destroyed. The primary villi, on the other hand, with the better preserved epithelium, escaped almost entirely.

Another noticeable feature of each section is the persistence of the trophoblasts, which appear occasionally in isolated groups, but for the most part near the decidual surface and in intimate relation with the decidual vessels, which they are apparently opening up. As they do this apparently, in part at least, independently of the villi there results a diffuse flow of blood into the intervillous space.

The so-called layer of Nitabuch is present as a comparatively thick deposit of fibrin over the decidua.

The decidua compacta makes up the outermost part of the placenta and shows few abnormal changes. In thickness it varies considerably in places corresponding to the hæmatomata, being considerably thinned out so as to give the appearance of papillæ projecting up into the intervillous blood space, which Walther described as growths of the decidua between the hæmatomata. It would seem, however, that this appearance was due rather to the fact that the decidua had been thinned out markedly between these by the opening up of its vessels by the trophoblasts, and it is noteworthy that these thinner portions correspond to the larger hæmatomata. The vessels of the decidua in the thicker portions are fairly numerous, to a large extent empty and somewhat flattened out, so that they appear as mere slits in the decidual tissue. In the portions of the decidua under the hæmatomata comparatively few vessels remain, having been opened up to a great extent by the trophoblasts. One excellent example of the opening up of a vessel was seen in which endothelium lined the vessel on the side nearest the decidua while on the other side a chorionic villus projected into the lumen covered on its surface by two distinct layers of cells, namely, syncitium and Langhans cells. In the decidua are also to be seen a small number of chorionic wandering cells which appear merely as isolated cells, nowhere in groups. These are situated for the most part near the inner portion of the decidua and have nowhere penetrated beyond its centre. There is also a slight degree of round-cell infiltration of the decidua, a fact also mentioned by Breus, but nowhere reported as a prominent feature, except by Micholitch, whose specimen, however, was not a pure Breus mole, but was complicated by other changes, including cystic formations. In one place

a small diffuse apparently fresh hæmorrhage into the decidual tissue is seen, so that the decidual cells are widely separated mechanically from one another. This is in the outer portion of the decidua and has no connection whatever with the hæmatomata. No degeneration of the decidual cells can be made out. Nowhere have the chorionic villi grown completely through the decidua as in one of the cases described by Breus.

Sections of that part of the peripheral membranes near the edge of the placenta, which also showed small slightly elevated protuberances, show decidua compacta which is apparently normal in structure. The chorionic villi are comparatively few in number, the large ones being well preserved and covered with a single row of epithelium, while the smaller ones were often found dead among masses of fibrin, blood, etc., and devoid of epithelium. Cross-sections of the umbilical cord show the presence of three columns of cells corresponding to the two umbilical arteries and the umbilical vein. These were surrounded by the Wharton jelly. They have apparently no lumen, but are made up of small cells with round, deeply stained nuclei. These columns of cells extend along the cord to a point above its insertion into the placenta, where they end abruptly and further on in the chorion no traces of vessels are to be found. There are no remains of a yolk sac to be found.

From the findings of the above examination it would appear that there had been an early attempt at the formation of vessels to connect the embryo with the placenta, that is a placental circulation, and that this process had been checked suddenly in its extent. Bauereisen reported the presence of traces of bloodvessels in the chorion and even as far as the villi, but these were nowhere well formed and merely tend to show that the process of vascularization had extended to a slight degree farther on, where it was also checked. The fact that the age of the embryo in these cases corresponds so nearly with the usual time of vascularization would lead to the idea that the sudden cessation was due to the death of the embryo as the most plausible cause and that the various stages of vascularization were due simply to a slight variation in the ages of the various embryo. But it is noteworthy that in all the cases of true hæmatommole reported the embryo has died before a vascularization of the chorionic villi has been accomplished.

The most striking characteristic of the chorion was the condition of its epithelium which has been given comparatively little attention in the reports of the other moles. Instead of the even two-rowed epithelium of the chorion which is normally present at this stage in the development there is, especially over the smaller villi, a marked thinning out of the epithelium, so that Langhans' layer of cells is either wanting entirely or appears only in the form of isolated cells and the syncitial layer is also broken in places. This condition of the epithelium may be partly explained by the fact that the villi,

whose epithelium absorbs fluid from the intervillous blood space, but which have no vessels to carry it off, become œdematous and this leads to a stretching of the superficial epithelium with a consequent break in its continuity in places and a subsequent desquamation. This process would seem in a way to be like that in the formation of the hydatidiform mole, but in the latter the excessive growth of the epithelium would more than keep pace with the swollen villi and would thus prevent a mechanical break in its course, while in the case of the hæmatommole there is an apparent general lack of growth on the part of the epithelium and an apparent arrest in the development of the chorion before a time when the secondary villi are well formed, which in itself is undoubtedly an important cause of the lack of sufficient epithelium. According to this theory the disappearance of the epithelium would be to a certain extent due to a purely mechanical cause.

With the disappearance of the epithelium there is a deposit of fibrin on the surface which, shutting off the only source of nutrition, leads to necrobiosis of the villi. With the death of many of these secondary villi, of which altogether very few have been formed, spaces are left practically devoid of living villi, a fact especially noted at the seat of the hæmatomata. Here again it seemed to be around these groups of dead villi that the hæmatomata formed. The chorion on the surface showed a slight tendency to folding.

With the necrosis and breaking off of the secondary villi there are left only the primary villi bounding spaces which are really enlargements of the intervillous blood spaces. Into these spaces between the primary villi, containing chiefly dead secondary villi which would furnish no support, there was probably a flow of blood which mechanically forced the wall up into the protuberances. This is strengthened by the fact that the microscopic examination showed the hæmatomata to be limited by the primary villi, and in the case of the lobular hæmatomata the lobulated form was caused by the presence of a strong primary villus which would not allow a bulging of the wall at that point. The fact that the hæmatomata are not always protruding above the surface, but may be entirely within the placenta, so as not to be noticed except on section, would tend to strengthen this view as against that of Breus and Walther, who thought that there were preformed sacs, and that into these the hemorrhages took place. The preformed sacs, if such they may be called, are merely enlargements of the intervillous blood spaces due to the death of the secondary villi. It was claimed by Breus that without a previous formation of sacs the lobulated forms and those with markedly constricted bases could not be explained, but as was seen in this specimen the constrictions between the lobules were due to the resistance and strength of the primary villi, and as these sometimes run obliquely into the placenta so as to come

together at their bases the stem-like formation would thus be explained.

The persistence of the trophoblasts and the progressive opening up of new decidual vessels, often apparently independently of the villi, would lead to the continual addition of new blood streams. Under the pressure of this blood distention can take place in only one direction, that of the amniochorion, since the decidua below and the strong primary villi laterally are resistant enough to prevent distention in these directions.

The increase in the size of the hæmatomata is thus due to a mechanical stretching of the amniochorion and may go on to a considerable extent, while the base is limited in size to the space between the primary villi and is constant, thus giving rise to the apparently stem-like forms. In this case no empty sacs were present. The fact that after the death of the embryo and the continued growth of the sac there would be an unequal pressure, would also tend to favor the formation of the protuberances, which would also be furthered by the uterine contractions. To assume the presence of hydramnios at an earlier period in the development is unnecessary.

In the present case there was no sign of endometritis. Gottschalk curetted the uterus in his case and found no endometritis whatever, so that, although Bauereisen and Walther found the presence of endometritis in their cases, this cannot be given as a causative factor in the development of the mole. A slight degree of infiltration of the decidua has been reported in several other cases, but never to such an extent as to have any weight.

As to the further changes which the ovum and embryo may undergo after long retention in the uterus very little is known. The embryos are usually very well preserved even after eleven months' retention, as shown in one of Breus' cases. As was seen in the present case, slight œdema of the chorionic villi has also been reported in other cases, while Veit stated that not infrequently in cases in which the ovum has been long retained in the uterus the same condition of the villi may be present as in the hydatidiform mole. This of course can be taken to apply merely to the presence of collections of fluid since no increased growth of the epithelium is present. Mickolitch reported one case of Breus mole, with the formation of bladder-like sacs in the chorionic villi, giving a picture very much like the hydatidiform mole, the only case of its kind on record; but while there may be a marked œdema leading even to these bladder-like sacs, none of the other characteristics of the hydatidiform mole are shown, there being no tendency toward an excessive growth of the epithelium of the villi but rather a retrogression.

There is no record of any case leading to metastasis or showing any signs of malignancy as in the hydatidiform mole. This fact

naturally has a distinct bearing upon the treatment which should be followed in these cases.

With the long retention of the ovum and embryo the latter seems to undergo a process of shrinking, for an analysis of the cases on record shows that the embryos are smaller in cases in which they are retained over nine months. This fact, together with the increase in size of the ovum after the death of the embryo, accounts for the marked disproportion between the two.

Symptoms. The clinical picture is that of a "missed abortion." The age of occurrence is less than that of the hydatidiform mole and is usually between twenty-five and thirty-five years, that is at the time when abortion is most common. It occurs more commonly in multiparous patients than in primiparæ, one case reported being that of a woman in her twelfth pregnancy. The previous history may be entirely negative and usually there is no history of endometritis and no previous abortions, although in one case the patient had aborted four times during the previous year. In Walther's case the patient had previously had two hydatidiform moles, but otherwise there had been no abortions. Taussig saw two Breus moles in the same patient. At first there are the ordinary symptoms of pregnancy, the cessation of menses together with all the subjective and objective signs. But after a long period of amenorrhœa there is not a proportional increase in the size of the abdomen, the uterus usually not growing beyond the size of a three or four months' pregnancy. The longest period of retention of the ovum was eleven months. In about three-quarters of the cases there was bleeding, often several months before the expulsion of the sac, and occasionally so marked as to be an alarming symptom. The hemorrhage is usually accompanied by pain in the abdomen. The expulsion is usually not accompanied or followed by fever.

Diagnosis. This is usually not made before the expulsion of the ovum, as it is difficult to distinguish it clinically from the ordinary retained ovum. In the latter, however, there is often a foul-smelling discharge accompanied by fever and general disturbances, symptoms which have not as yet been observed in cases of Breus mole. The physical signs are directly the opposite of those seen in the case of the hydatidiform mole, in which the uterus grows out of all proportion to the duration of pregnancy. As a rule, it is not difficult to distinguish it from tumors which are not the result of pregnancy, since the usual signs of pregnancy which are present serve to make this distinction. The diagnosis of myoma has, however, been made. A summary of the clinical and pathological characteristics which will serve in the diagnosis is as follows:

1. The marked disproportion between the size of the embryo and the period of gestation.

2. The relative absence of symptoms of intoxication from the long retention.

3. The disproportion between the size of the embryo and that of the ovum.

4. The presence of the tuberous hæmatomata, which may be lobulated and have constricted bases.

5. The lack of bloodvessels in the chorionic villi.

6. The poor development of the epithelium of the chorionic villi, which may be entirely absent, the layer of Langhans' cells being particularly poorly formed.

7. The persistence of the trophoblasts.

8. The poor development of the embryo, which may not be found at all, having been absorbed. It usually corresponds in size to that of four to six weeks' development.

The prognosis is good. There is as a rule no recurrence, although one case has been reported in which a second hæmatommole was formed within a year. There is no infiltration of the uterine wall by the mole. The only troublesome symptom, the hemorrhage, while in some cases rather severe has never proved to be a serious complication. The presence of broken-off villi in the decidual vessels, which were described by one writer suggests the possibility of embolism, but this has never as yet been observed.

The treatment which has been adopted in practically all of the cases on record has been an expectant one. This has been due, in all probability, to the fact that the diagnosis has rarely been made previous to the expulsion of the ovum. If the diagnosis were made, the question of emptying the uterus by the usual methods would suggest itself, but its indication is an unsettled point. In the presence of excessive hemorrhage, however, immediate emptying of the uterus is indicated.

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A METHOD FOR THE ISOLATION OF TYPHOID AND COLON BACILLI FROM DRINKING WATERS, ETC.

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The problem of separating typhoid bacilli from samples of drinking waters, etc., by a method which shall at the same time be certain, easy, and fairly rapid, has received the attention of numerous investigators. As a result of all their researches we have various modes of isolation and diagnosis of these organisms. Eliminating the processes of "proving" the organism either colon or typhoid bacilli—the difficulty always presented is that of isolating the particular bacillus, and this, I think, is the greatest obstacle which we have to overcome. When these organisms are present only in very minute quantities, accompanied, or perhaps crowded out, by numerous other bacteria, then, indeed, the difficulty of isolation becomes almost insuperable.

Bacteriologists will, I am sure, agree that under such conditions a great deal of time and labor is demanded, and they must often be much surprised by the ease and rapidity with which colon and typhoid bacilli are often diagnosed with certainty by novices.

In my own experience I find that the usual test applied is a "presumptive test," namely, the production of gas in glucose broth, or some modification of this. This is more often than not the extent of the investigations. Now there is no denying the fact that, over and over again, by such incomplete work, an incalculable amount of damage is done—a public or private water supply, for instance, is glibly condemned on such flimsy evidence. The remarks contained in the Report of the Massachusetts State Board of Health, 1903, p. 263–264, suggest the situation admirably.

As regards the various special media which have been recommended for promoting the growth of colon and typhoid bacilli, nothing need be said here. They are all well known and some of them are extremely useful.

Before describing my method of isolation which depends largely upon the motility possessed by these two organisms, reference must be made to one or two bacteriologists who have attempted to avail themselves of this property of movement, viz., Pakes,[1] Cambier,[2] Moore,[3] and Stoddart.[4] They do not seem to have been encouraged by their results and abandoned them as not leading to any practical outcome.

The method which I here put forward is based upon three facts appertaining to colon and typhoid bacilli:

First, their motility.

Second, their power to grow in some medium which possesses a restraining action upon many other bacteria.

Third, their ability to grow anaerobically.

Expressed briefly the rationale of the work is as follows:

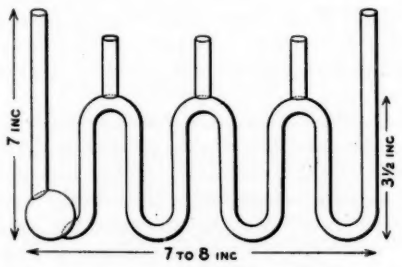
1. The motility will separate the colon and typhoid bacilli from non-motile organisms, and from those less motile than themselves.

2. The restraining medium prevents the ready growth of most organisms except colon and typhoid bacilli:

3. The anaerobic conditions prevent the development of aerobic organisms which form the majority of bacteria with which one comes into contact in ordinary bacteriological examinations.

These three factors when acting together at the same time practically ensure colon and typhoid bacilli having the ascendancy.

The following are the details of the method of applying the principles:



Apparatus for isolating typhoid and colon bacilli.

Apparatus. A piece of glass tubing, one-quarter or, better, three-eighths of an inch in diameter, is bent in the manner shown in the accompanying illustration. A bulb is blown near the lower part of the first limb (bulb about 8 or 10 c.c. capacity) and observation openings are made in the uppermost parts of the bent portions.

[1] Bact. Examination of Water, by Honocks, p. 102.
[2] Revue d'Hygiene, 1902, p. 64.
[3] British Medical Journal, March, 1902, p. 773.
[4] Personal Communication, 1901.

This apparatus is filled with ordinary nutrient broth (*titre*, + 1 per cent. normal acid), to which 0.05 per cent. pure carbolic acid has been added. The openings are plugged with wool and the whole sterilized in Koch's sterilizer for one hour. Inoculations are made at the bulbous end. The tube is then placed beneath a bell jar, in which perfect anaerobic conditions can be assured. This latter point is extremely important because, if not carefully carried out, it will lead to endless failures. The whole apparatus is then placed in the incubator at 37.5° C. At the end of twenty-four, thirty-six, or forty-eight hours samples are taken (about 1 c.c. in quantity) from the observation tubes in order, starting from the one next the bulbous end, and then spread out on Conradi-Drigalski medium. These plates are then incubated at 37.5° C., and during the next twenty-four hours colon and typhoid bacilli will be revealed if present in the original inoculations.

Here I would call attention to another important fact, namely, that typhoid bacilli generally separate from colon bacilli under these conditions. The typhoid bacilli travel faster and farther than the colon bacilli, and usually show up one or two tubes ahead of the colon bacilli. In this manner I have always succeeded in obtaining the typhoid bacilli free from the colon bacilli within forty-eight hours.

A large number of observations have been made extending over many months, with mixtures containing all kinds of bacteria with which one meets, and which the laboratory stock could supply; in no case did I fail to obtain the colon and typhoid bacilli when present. When these two organisms were in minute quantities, as compared with other bacteria, the results were just as favorable.

When using mixtures containing many non-motile forms there was never the slightest difficulty in inducing the typhoid and colon bacilli to free themselves, and in order to put the scheme to severe practical tests, mixtures of all the common motile organisms were generally used.

The actual details of the very numerous experiments under these conditions need not be set forth here as they would only be wearisome to the reader, but as a final statement of the efficacy of this process, I must record the results of one or two experiments where the colon and typhoid bacilli were present only in minute quantities.

Common river water containing the usual varieties of bacteria, was inoculated with typhoid bacilli and from actual counts made the proportion of typhoid bacilli was 350 to the litre. From 50 c.c. of this water the typhoid bacilli were recovered by the process above described.

Colon bacilli were present in the proportion of one bacillus to 1 c.c. of water, and were easily recovered.

As already remarked, in using mixtures of colon and typhoid in minute quantities the typhoid always separated itself from the colon, but both have been recovered.

Having isolated the organisms in this way any confirmatory tests can be applied according to the wishes of the investigator.

In plating out from the experimental tube I have recommended the Conradi-Drigalski medium, and this I do because it offers a great advantage over ordinary agar, especially in the discrimination between typhoid and colon when present together; however, ordinary agar plates will give good results, but the difficulty of discriminating between typhoid and colon when present together on the same plate is much greater under these circumstances. Endo's medium is also a good one to use.

In commenting upon the process for the benefit of others I would give one or two hints regarding some of my failures. Occasionally I have found the ordinary motile organisms, and sometimes true aerobic ones, growing along the whole length of the tube, and in one or two exceptional instances even non-motile organisms. This I discovered to be due to my carelessness in handling the apparatus when putting it into, or taking it out of, the incubator. I found that by turning around quickly with the apparatus in my hands I set up distinct currents of a swirling character inside the tube, and thus brought about a mixing of the contents, which I did not desire. Again, subjecting the apparatus to different degrees of temperature, needlessly repeated, also sets up convexion currents, which sometimes interfere with perfect working. Having put the apparatus in the incubator there is no necessity to take it out until one is actually about to take samples at the end of thirty-six or forty-eight hours, so that one disturbs it only once. If these words of caution are attended to, and these experiments carried out as I have described, I can guarantee successful results to anyone who wishes to investigate them for himself.

Before concluding I should like to add a few words with reference to its application to the bacteriological examination of water. The presence of colon, and perhaps typhoid, bacilli can be demonstrated if they are sufficiently numerous, by direct inoculation with 1, 5, or even 10 c.c. of water. If one wishes to test larger quantities of water for the presence of these two organisms then some process of concentration must be adopted.

Personally I use the well-known one of filtering through a Berkefeld filter, then brushing the organisms into a given quantity of broth or water and inoculating varying quantities of this concentrated mixture, which represents different amounts of original water. I have had extremely good results with this method of isolation when testing samples of natural drinking waters containing a few colon bacilli. Up to the present I have never had the good fortune to come across a sample of natural drinking water contaminated with typhoid, but from the experiments enumerated above, in which I inoculated drinking water with typhoid bacilli in the same proportion as one would expect under natural conditions, I was able to isolate them,

and there is good reason to suppose that were we dealing with a natural water also contaminated with typhoid the outcome would be equally successful.

REPORT OF AN EPITHELIAL LINED FISTULA-IN-ANO IN AN INFANT.

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The special treatises on diseases of the rectum and anus bear witness to the relative scarcity of the fistula-in-ano during infancy, and such cases as are recorded are, from a pathological standpoint, placed in the same category as those encountered in the adult and attributed to like etiological factors, conspicuously tuberculosis.

A number of times I have encountered this condition in infancy and childhood and three times in nurslings. The treatment of these fistulæ calls for radical procedures—division and excision. In their tendency to recur they also partake of the features peculiar to the fistulæ of adolescence.

That tuberculosis alone is not responsible for this lesion the report of the following case suffices:

A male breast-fed infant, aged three months, was brought by its mother, who directed attention to a constant discharge of moisture and feces from a small opening near the anus. Examination: Within one centimetre of the anus there was to be seen a minute opening without any areola or infiltration which betrayed signs of previous inflammation. A No. 1 Bowman probe easily entered the fistula, and its free end, after passing upward for a distance of 1.5 cm., was to be felt by the finger introduced into the rectum, just beyond the internal sphincter. No blood whatsoever appeared after this manipulation.

Operation. Following the usual preliminary preparation, and under an ethyl-chloride narcosis, the sphincter was stretched and the fistulous tract divided on a grooved director. It could be seen that the entire tract was lined with a delicate epithelial membrane easily movable over the underlying soft parts. It was excised and the wound allowed to heal by granulation. Complete healing set in within two weeks, and was attended with restoration of the sphincter.

Microscopic examination of the membrane showed structures peculiar to the skin or mucous membrane. There were several superimposed layers of epithelium; those on the surface stratified the deeper ones cylindrical; the papillæ not so marked. The

cellular tissue beneath was normal and free from the cellular infiltration characteristic of inflammation.

Chiari,[1] in 1878, directed attention to the fact that in 800 cases examined on the postmortem table he found great variability in the depth of the lacunæ Morgagni, amounting to actual diverticula at times. In five instances a fistula was continuous with these diverticula. He regarded these diverticula within the grasp of the sphincter due to pressure from within the bowel, similar to the pressure diverticula of the pharynx in distinction to the traction diverticula. A traction diverticulum would lie beyond the grasp of the sphincter and be brought about by the contraction of a cicatrix adherent to the bowel.

Graser[2] has called attention to diverticula of the large intestine, due to deficiency in the muscular wall, in consequence of chronic congestion of the mesenteric vessels; so it is not unlikely that the varicose condition of the veins in the rectum may be a like factor in determining the diverticula.

Meisel[3] reports two cases of fistula-in-ano in adults in which the tract was lined with epithelium. He regards both of these cases as due to diverticula in the sense pointed out by Chiari.

Neumann[4] reports a pararectal pouch filled with feces. This he attributes to some faulty union of the bowel with the cloaca.

The fistula-in-ano of the infant herein reported I believe can best be explained on a congenital basis, due to inclusion of the skin at the time of fusion of the structures. An analogous condition is met with in the case of some of the paraurethral passages.

While relatively rare, it is deemed worthy to direct attention to this variety of fistula, the persistence of which is inevitable unless the entire epithelial tract be excised.

[1] Ueber der Analen Divertikel der Rektalenschleimbant u. Ihre Beziehungen zu den Analfisteln, Wiener medizinisch. Jahrbuch, 1878.

[2] Ueber Multiple Darmdivertikel in der Flexura Sigmoidea, Muenchener medizinische Wochenschrift, 1899, S. 721.

[3] Ueber Epithelbekleidete Analfisteln, Bruns, Beitrage z. klinischen Chirurgie, vol. xxviii. p. 293, 1900.

[4] Deutsche medizinische Wochenschrift, 1896, p. 150.

THE ADVISABILITY OF ELIMINATING THE TERMS MENIERE'S DISEASE AND MENIERE'S SYMPTOMS FROM OTOLOGIC NOMENCLATURE.*

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Meniere described the following case:[1] "A young girl during menstruation acquired a heavy cold while riding in the night on the imperial of a coach. She suddenly vomited, became dizzy, and deaf in both ears. On the fifth day she died. The autopsy revealed that no changes had taken place in the brain or in the spinal cord. The semicircular canals, however, were filled with a red, plastic, blood-like exudation, of which scarcely any traces were discovered in the vestibule and none of which was found in the cochlea." Ménière became convinced that the disease which he described did not emanate from the brain but from the ear. In a communication to the Academy he draws the following conclusions from his observations.[2]

1. A hearing organ hitherto entirely well can suddenly become the seat of f_nctional disturbances consisting of various continuous or intermittent subjective noises with which, soon, a more or less great decrease of hearing is associated.

2. These functional disturbances are located in the inner ear and can cause attacks coming seemingly from the brain, namely, vertigo, feeling of being stunned, staggering gait, turning motion, and sudden collapse; furthermore, they are accompanied by nausea, vomiting, and syncope-like condition.

3. These attacks, which repeat themselves after free intervals, are invariably followed by a mostly grave diminution of hearing, and frequently the hearing is destroyed suddenly and completely.

4. All this leads to the supposition that the material cause of these functional disturbances is located in the semicircular canals.

The disease causing hardness of hearing, tinnitus and vertigo was named "Ménière's disease." Soon it was detected that hardness of hearing, tinnitus, and vertigo in various degrees were found in a number of instances for which the term "Ménière's disease" could not be employed, because the patients did not present the clinical entity described before, nor did the symptoms make it probable that the pathologic findings would correspond to those in Ménière's patient. In order to accommodate these cases in regard to the terminology the term Mèniére's (complex of) symptoms was introduced. It did not take long for a discussion to arise as to the proper appli-

* Read before the First Councillor District Medical Society, Ann Arbor, Michigan, December 22, 1905.

cation of either term. That the abundance of observations suggested that even these two terms would not be sufficient to cover the whole group of diseases which were now recognized as representatives of an important array of afflictions led to further concessions in terminology. Ménière had entered a dark corner; he discovered and illuminated the entrance of a recess in medicine, so to speak; but the light of this one man was extinguished before he could discover the great extension and the many ramifications of the territory which are by no means all known to-day.

The literature on the subject is voluminous. I quote only a few pertinent remarks.

Eitelberg[3] says: "And even in the apoplectic form it is not established with certainty that the pathologic conditions shown by Ménière must be the cause of the same, because the disease ends fatally only in extremely rare cases." . . . . "Besides, those attacks frequently pass by very quickly, whereas the resorption of an exudate must take a much longer time. Furthermore, one has repeatedly found that a catarrhal affection of the middle ear, with or without exudate, can be the cause of Ménière's symptoms, even if they appear suddenly. These symptoms have been observed to disappear as soon as the middle-ear catarrh had been improved or cured. In these cases we are more inclined to think of a momentary irritation of the acoustic nerve through increased labyrinthian pressure, or to think more of a reflex causation, than of an apoplectic exudate into the semicircular canals. It would be necessary also to eliminate these cases if we would be so very particular about the definition. In view of the fact, however, that Ménière himself was acquainted with the relation of the middle-ear affections and the symptoms mentioned before, we shall not pass judgment so severely on the definition of Ménière's disease and will allow it to stand even there where only the most important symptoms appear, namely, sudden and violent vertigo, with nausea and vomiting, after the other symptoms, namely, hardness of hearing and tinnitus, have already existed for some time."

I cannot agree with this view. Since Ménière's publication a variety of similar clinical pictures have been described and we are obliged to discriminate more correctly. We learn that affections of the labyrinth, with tinnitus, hardness of hearing, vertigo, etc., can be caused[4] "by anæmia, narrowing and embolism of the arteria auditiva interna or of the arteria basilaris (in consequence of compression by tumors or aneurisms or endarteritis chronica), by angioneurosis and free gas bubbles in the labyrinthian vessels in consequence of too rapid decompression in people working in caissons, and in divers. Furthermore, we find the symptoms mentioned before in hemorrhages caused by fractures of the temporal bone, in diseases of the cerebrum and its coverings, through changes in the walls of the bloodvessels (in syphilis, nephritis, leukæmia, diabetes mellitus, atheromatosis, heart lesions), and in middle-ear suppurations."

Alt[6] says that the local symptoms mentioned can be found also in infectious diseases. "In the latter the middle ear need not necessarily be affected. In rare cases hemorrhages can be caused by sudden increase of pressure in the outer ear canal. In an abortive form of cerebrospinal meningitis the inner ear can be affected, showing fever, headaches, vomiting, convulsions, etc., leaving behind them total deafness and staggering gait. Secondary inflammation of the labyrinth can lead to new formation of connective tissue. This tissue can take up salts or be transformed into bone. Concussion of the labyrinth may result in hardness of hearing and tinnitus."

Tuberculosis[6] of the labyrinth can cause deafness, tinnitus, and vertigo.

Whether similar disturbances occur in the status lymphaticus is not known to me. Theoretically, at least, they appear probable. Albert P. Ohlmacher[7] mentions conditions which are closely related to those in which disturbances of the inner ear have been found. He says: "Hypertrophy of the brain is mentioned by Rokitansky as one of the features of status lymphaticus, at times combined with cerebral œdema or with widening of the ventricles and increase of intracerebral fluid. In some of the recently studied cases one or more of these conditions are mentioned, and, in certain epileptics in the lymphatic state, general cerebral hypertrophy, localized hypertrophy, œdema, or hydrocephalus may appear." . . . "Again, one may find status lymphaticus associated with certain other diseases and their anatomical changes, as, for example, Basedow's disease, struma, scrofula, and pseudoleukæmia."

Dr. T. Wilson Parry[8] mentions that besides numerous general and special text-books he had before him two hundred and sixty papers referring to Ménière's symptoms. He defines three pathological conditions which should be considered:

1. An acute exudation or sudden hemorrhage into the labyrinth (a true Ménière's disease).
2. Chronic labyrinthian lesion not due to the above causes.
3. Secondary labyrinthian sources of irritation which are chiefly of tympanic origin.

He says: "If the one essential characteristic of true Ménière's disease not supervening on a previous disease be labyrinthian apoplexy then these are all undoubted cases of true Ménière's disease, for the microscope clearly reveals the perilymphatic space between the membranes and osseous semicircular canals completely filled up with an effusion of blood, some of which has been organized into newly formed bone."

"Excessive mechanical pressure thus induced acting upon the vestibular nerve endings produces an irritation which provokes the urgent consciousness of disordered equilibration. The symptoms of tinnitus (positive) and deafness (negative) are auditory phenomena, and are due to irritation and loss of function, respectively, of the

cochlear branch of the auditory nerve. This "auditory" nerve travels to the nucleus accessorius, thence as auditory fibres along the striæ acusticæ, and, ascending in the lemniscus passes upward to the cerebrum without the intermediation of the cerebellum, to which the equilibrial fibres eventually find their way." Speaking of extralabyrinthian causes, Parry refers the effects of retracted and ankylosed ossicles to the spasmodic condition of the tensor tympani muscle or paralysis of the stapedius. He quotes a case described by Politzer in which a bony growth on the external labyrinthian wall had grown over the foramen ovale and was united to the stapes, producing symptoms of the true Ménière's disease.

The attacks caused by syringing the ear, by the pressure caused by cerumen and by thermal irritations, are well known.

The whole picture becomes complicated when we consider that the so-called Ménière's symptoms can be caused by an angioneurosis. Brunner[9] says: "There must be mentioned an observation by Scanzoni (transitory deafness with general irritation of the vessels and symptoms of urticaria after application of leeches to the vaginal region)." This must, perhaps, be taken as a reflex angiospasmus (or angioparalysis) of the labyrinthian vessels.

Brunner quotes a case of Politzer, classified as angioneurotic paralysis of the acusticus, in which galvanization of the sympathicus of the neck made the attacks of vertigo, marked hardness of hearing and tinnitus disappear.

Whether we have a condition before us which resembles somewhat the still questionable relation between the sympathicus and glaucoma I should like only to hint at.

Parry[10] relates a case in which the application of a seton had a very beneficial effect. He says: "The reasons that I have such full faith in the seton, after drugs have been found to be of no avail, are the following: . . . . I believe that it acts reflexly on the vasomotor system by means of the sympathetic, so as to cause constriction of the vessels in the vicinity of the lesion," etc. . . . .

Frankl-Hochwart, in his monograph (*Der Ménièresche Symptomen Complex; Die Erkrankungen des inneren Ohres*, Wien, 1898; Alfred Hoelder) gives a detailed classification of the kindred affections and mentions (page 30) pseudo-Ménière's attacks in hysteria, as epileptic aura, and in hemicrania.

In regard to vertigo, Wundt[11] says: "Vertigo can usually be created in two ways: first, through the disturbance of function of certain peripheral organs of sense, the impression of which causes the appearance of those sensations which create the perception of the static equilibrium of the body during rest and motion; and second, through central disturbances of function, which are apt to change in any manner whatsoever the normal relation between the impressions of our senses and the motions or perceptions of motions. With an organ of sense of the first variety we shall become acquainted in

the ampullæ and in the semicircular canals of the labyrinth of the ear. Compared herewith the cerebrum seems to be that central organ of which the experimental or pathological changes cause, most frequently, objective or subjective symptoms of vertigo through central causes. On account of the close neighborhood of the labyrinth to this central organ it can be under stood that both forms of disturbance of equilibrium, the one caused peripherally and the other caused centrally through affections of the cerebellum, can frequently not easily be separated."

He further remarks:[12] "The disturbed function of a peripheral organ of sense or of a central region can produce sensations of vertigo only in that manner, that the normal co-ordination of the impressions of the senses to the movements of the body is injured in some manner. In fact, it can easily be seen that the creation of vertigo can always be referred to this general condition, when we find as its cause subjective or objective reasons. For this reason its occurrence in single instances can be caused in a manifold manner, centrally as well as peripherally. The inexperienced becomes dizzy when he walks on the ice. The uncertainty of vision, as it occurs in the amblyopic, or strabismic, or in a person with normal vision when he covers up one of his eyes, is not infrequently accompanied by dizziness. Still more plainly we see it occur in the walk of those in whom the degeneration of the posterior columns of the spinal cord dulls or abolishes the sensation of touch. The patient does not feel as he used to the existence of the ground, and he loses his equilibrium, he staggers and tries to save himself from falling down, by balancing with his arms."

The conclusions to be drawn from these observations are plain and correspond with the stand taken by E. P. Lyon,[13] who says: "Throughout my experimental work I have tried to adhere to the following rules:

"1. If stimulation of a sense organ or part of the nervous system calls forth a certain reaction (motion) it is certain that the stimulated organ is connected by nerves with the centre of this motion, but not that the stimulated organ itself is the centre.

"2. If through extirpation of an organ a function is eliminated it is certain that the extirpated organ is connected by nerves with the centre of this function, but not that it is itself the centre.

"3. If after extirpation of an organ an organic function which ordinarily is lost after this extirpation remains *in one case only* it is certain that the extirpated organ is not the sole centre of this function."

Landois[14] says: "Strange to say, we find sometimes in chronic affections of the stomach inclination to attacks of vertigo (Trousseau's stomach vertigo). It is, perhaps, created by an irritation of the nerves of the vessels of the labyrinth through an irritation of the nerves of the stomach. This would influence the pressure condi-

tions of the endolymph. In an analogous manner an 'intestinal vertigo' (Leube), a 'larynx vertigo' (Charcot), and a 'urethral vertigo' (Erlenmeyer) have been described."

Wagenhaeuser[15] says: "We must mention under the head of vertigo caused by reflex the observations in which the symptoms showed themselves under the influence of strong or strictly identified sound impressions. Schmidekam mentions in this connection the strong tone of a sirene; Roosa, Ely, Jacobson, high tones; Bechterew ringing of bells and rolling of a carriage; v. Frankl-Hochwart the Tarnhelm motive in R. Wagner's "Götterdämmerung." Of interest is another patient of this author, who became violently dizzy during the Weber's test with the C-fork, and only when this fork was used. Ménière's symptoms caused by poison are repeatedly mentioned in the literature. Sapolini observed thirteen causes in which the symptoms appeared when a hair-dye with nitrate of silver was used and disappeared when the dye was discontinued; furthermore, Haug accuses mushrooms, Woakes, nicotine."

Alt (quoted by Wagenhaeuser) gives the anatomical basis for a case of morbus Ménièri in which a leukæmic infiltration of the acoustic nerve was found, whereas the middle ear and the labyrinth were intact.

Wagenhaeuser quotes Siebenmann's interesting findings in multiple spongification of the labyrinthian capsule: "The author (Siebenmann) calls attention to the close approach of extreme spongious spaces to the endosteum of the labyrinth, where the mighty lymph spaces of the newly formed spongiosa appear to be separated from the perilymph of the labyrinth only by thin membranes. Through these changes the pressure and density of the labyrinthian fluid could not only be subjected to an alteration in consequence of processes of diffusion, but some portions of the specimens proved clearly that the separating wall between the two lymph systems, which is now reduced to a membrane of connective tissue, can also be resorbed, whereby perforations develop with sudden changes in the intralabyrinthian pressure and intralabyrinthian position." Wagenhaeuser (*loc. cit.*) mentions that in the ear clinic in Tübingen as predisposing causes for morbus Ménièri are mentioned leukæmia, lues, and tabes, effects of great sunheat and mental overexertion.

Frankl-Hochwart[16] speaks of the labyrinth affections caused by toxic diseases. He mentions parotitis (Politzer), which very frequently is combined with scarlatina nephritis; he speaks of parotitis, typhus abdominalis and exanthematicus, variola, measles and influenza, cerebrospinal meningitis, quinine and salicylic acid, antipyrin, antifebrin (Haug), chloroform (Moos and Haug), chenopodium (North), atropine (Haug), hydrargyrum (Wolf), marsh gas, coal gas, illuminating gas.

O. Wolf,[17] speaking of deafness in consequence of lead poisoning (surditas saturnina), says that when the ear is affected, vertigo,

tinnitus, and more or less rapid decrease of hearing appear. He quotes Tanquerel, who found in lead poisoning an induration of the ganglia of the neck, and Kussmaul and Meyer, who could demonstrate an increase and sclerosis of the connective tissue in the ganglion cœliacum in the autopsy of a man who died immediately after an attack of colic with severe enteric symptoms.

Frankl-Hochwart[18] mentions nephritis, pernicious anemia, morbus maculosus hemorrhagicus Werlhofii. While changes in the inner ear are rather rare in these affections, he mentions that nervous deafness is not infrequently found in leukæmia. Marasmus is also cited as one of the causes of affections of the inner ear. Atrophy of the labyrinth is described, as he says, by Voltolini, Toynbee, and Habermann.

Parry[19] mentions a case which in my mind forms the one extreme in the most varied conditions to which the term Ménière's disease has been applied. He says: "I have pleasure in being able to place before you a case of Ménière's disease, the new treatment of which, namely, hypnotic suggestion, has been entirely satisfactory. So far as I am aware, it is the first case in London treated in this way; and even in Paris, the home of hypnotism, one has not read of any cases that have been treated by this new method. The honor of recommending this treatment and carrying the case to a most successful issue is entirely due to Dr. A. Ernest Jones, of University College Hospital. The brilliant result, as will be seen from the full notes adjoined to this article, far exceeded our most sanguine expectation. The picture of the cure of a man of forty-four years, who had become prematurely old from constant worrying and depressing effects of eight years' unbearable tinnitus, vertigo, and vomiting is vivid enough without further comment."

Wagenhaeuser[20] says: "A look into the literature lets us recognize the lack of uniformity, the veritably confusing condition which is prevalent in this respect. The same 'Ménière's disease' which had been accepted for the disease described by Ménière was extended soon to all processes with symptoms of vertigo, tinnitus, and more or less outspoken hardness of hearing. . . ."

"Also Knapp, Politzer and others brought prominently forward the fact that two different conditions are united under this name, and they proposed to name only the suddenly appearing apoplectic-like deafness which shows itself with the characteristic symptoms 'Ménière's disease morbus Ménièri,' whereas the name 'Ménière's vertigo,Ménière's symptoms,'should be used for all other disturbances of hearing which are combined with subjective noises and vertigo. Again, others, following Brunner's proposition, abandon entirely the name 'Ménière's disease' and want to have used, only very generally, the term 'vertigo Ménière,' Ménière's complex of symptoms."

In a monograph[21] Brunner says: "One should speak of Ménière's symptoms only if the attacks of vertigo come spontaneously without

external influences and if they come suddenly, mostly in repeated attacks, without fever, with more or less violent noises and rapid or only gradual appearance of hardness of hearing, and by and by one has become accustomed to speak of any vertigo with nausea and vomiting originating from the ear as Ménière's vertigo, Ménière's symptoms, and one has gradually admitted the same to be created—

"1. Through influences from the external and middle ear;

"2. Through diseases of the labyrinth;

"3. Through diseases of the brain and of the acoustic nerve; and

"4. Through neurosis, *e. g.*, of the sympathicus (angioneurosis)."

We do not speak nowadays of heart disease or of heart symptoms, of lung disease or of lung symptoms, nor of kidney disease or of kidney symptoms. We are expected to diagnose and name a recognizable affection of these organs more definitely, and if this is impossible, in some instances, we leave the question open with the understanding that further investigation is required to clear up some dark points. The same rule, I think, should be followed in otitis interna.

CONCLUSIONS. 1. The triad: Hardness of hearing, vertigo, and tinnitus is given as constituting the functional disturbance observed in the so-called Ménière's disease.

2. These symptoms occur also in numerous affections which are not based on the pathological finding as described by Ménière in his historical case.

3. The observation that not always a typical picture is present has led to the introduction of other terms, such as "Ménière's symptoms," etc., which has proved to be confusing.

4. Even affections of the middle ear, of the outer ear, or of other parts of the body can cause the symptoms described by Ménière.

5. These latter causes can be diagnosed in many instances and prove the existence of a great group of affections characterized by functional disturbances of the inner ear.

6. By abandoning the terms "Ménière's disease" and "Ménière's symptoms" a more definite nomenclature can be introduced. This is important not only from a physiological and pathological, but also from a clinical standpoint. By using, for instance, the terms "otitis interna syphilitica," or "leukemica," or "angioneurotica," or "gastrica" a clearer conception of some affections would ensue.

7. The various terms should be agreed upon. The many international medical meetings give ample opportunity for such a procedure.

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REVIEWS.

THERAPEUTICS: ITS PRINCIPLES AND PRACTICE. By HORATIO C. WOOD, M.D., and HORATIO C. WOOD, JR., M.D. Twelfth edition. Philadelphia and London: J. B. Lippincott Co., 1905.

THE reappearance of this old friend in its successive editions is always pleasant, even though this last one is very different from the book from which many of us studied in former days. The changes have been brought about partly by the radical alterations in the new Pharmacopœia, and partly by the recognition that a text-book is not always a ready book of reference for the practitioner. The association of H. C. Wood, Jr., with his father, has doubtless been of help in the thorough revision of the work, which places it on a plane as high and modern as any book of the day dealing with drug therapeutics.

The authors have retained the old classification of drugs according to their physiological actions. The chapters on expectorants and disinfectants have been rewritten and a new classification of these drugs adopted. There is also a detailed consideration of local anæsthesia, including the so-called spinal and neural anæsthesia. Over seventy new drugs have been added, making the part of the work dealing with materia medica quite as thorough as needful.

The discussion of the newer drugs, such as aspirin, argyrol, urotropin and many others, are satisfying both to the scientist and the practitioner. Especially admirable are the sections upon Gelatin as a Hæmostatic and the Therapeutics of Adrenalin. It may strike one as peculiar to see the various serums and extracts of organs classed under the alteratives, though in the classification adopted this is doubtless their proper place. The chapters upon Cold and Heat and Electricity are up to their former high standard, but we miss a consideration of Hydrotherapy, Lavage, Hypodermoclysis, Venesection, the Nauheim Treatment, and other remedial measures not medicinal. With these exceptions the work seems complete, as far as one which lays especial emphasis upon drugs can be in the present age, when, on the one hand, climatic and dietetic treatment is claiming so much attention; and, on the other, surgery is becoming a more and more intimate co-worker with medicine. However, there is much work left for drugs to do, and doubtless we are in danger of allowing the pendulum to swing too far away from the lights of our forefathers. The treatise is intended as a text-book for stu-

dents and as a book of reference for practitioners. A great help for the former are the new summaries of physiological actions of the various drugs. An alphabetical list of diseases with page reference to the remedies used in their treatment, is a needed innovation which makes the volume of much practical use as a reference book of treatment. A complete and systematic bibliography appended to each section adds much to the scientific value of the book. In its type and binding the volume closely resembles the previous editions.

J. D. S.

THE DIAGNOSIS OF DISEASES OF WOMEN. A TREATISE FOR STUDENTS AND PRACTITIONERS. By PALMER FINDLEY, B.S., M.D. Second edition, revised and enlarged. Philadelphia and New York: Lea Brothers & Co., 1905.

To the many who have known this book in its earlier edition it will be only necessary to say that by the inclusion of new material it has been brought thoroughly up to date. New chapters have been added upon blood and also bacteriological examinations.

The intent of the volume is to supply the English reader with a book which will fill the place of Winter's *Gynäkologische Diagnostik*, by presenting the question of gynecological diagnosis in a more complete and detailed manner than is possible in volumes devoted to the consideration of gynecology as a whole.

The subject-matter of the work is divided into three parts: the first dealing with what the author calls General Diagnosis, and including the consideration of the clinical history, the physical examination, the uses of the various instruments employed in making a diagnosis, as the vaginal speculum, the uterine sound, and tenaculum forceps; and also chapters upon the Microscopic Examination of Scrapings and Excised Pieces, Examination of the Blood, and Bacteriological Examinations. The second portion is devoted to Special Diagnosis, and consists in a detailed consideration of the whole subject of gynecological disease viewed from the standpoint of diagnosis. The first chapter is concerned with the diagnosis of pregnancy and is in every way complete. It is difficult to pick out any particular chapters for the purposes of comment, since the general excellence is so marked, but we think that those upon the diagnosis of chorioepithelioma malignum, ectopic pregnancy, and diseases of the ovary are particularly good.

The author has enhanced the value of the book and also aided the students to grasp the subject by including, to some extent, the indications for treatment, as these are explained by the pathology of the various processes.

The third section of the book takes up the diseases of the urinary system and includes the consideration of the ureters, urethra, kidneys, bladder, and the question of the abnormalities associated with micturition.

The illustrations are especially good and particularly well chosen and executed, while the printing and binding are both of the standard of excellence set by the publishers. W. R. N.

FOOD AND DIET IN HEALTH AND DISEASE. By ROBERT F. WILLIAMS, A.M., M.D. Philadelphia and New York: Lea Brothers & Co., 1906.

THIS book is for the intelligent housewife as well as for physicians and nurses, and presents the essentials of the purely scientific part of the subject of dietetics in a form intelligible to any one who has had the most ordinary advantages in the way of education. Whenever possible full explanations are given for known physiological facts and for generally accepted principles of diet in health and the nursing and feeding of the sick. The introductory remarks to the various subjects in each instance contain a concise statement of the principles on which the best medical practice is based, without unnecessary discussion of the differences in prevailing views. Certain questions of special interest, however, receive full consideration, as, for example, the food value of alcohol in health and in disease. The author's views may be epitomized in his own words: "If (alcohol is) a food, it is one which has no advantage over many other food substances, and is, therefore, never necessary for food purposes." He holds the view that alcohol is at no time a true stimulant, and that the apparent stimulation of heart and brain is due to the fact that the depressing action of the drug manifests itself first on the higher centres. By depressing the inhibitory cells of the brain, restraint is removed and control lessened, so that the heart acts more rapidly and more vigorously (in part also on account of the vasomotor relaxation in the peripheral vessels), the imagination is more active and speech flows more readily because the customary relf-restraint is relaxed. Its use is, therefore, never necessary in health, and in disease the same effects can be as well obtained by other means. Although scientific evidence for such views seems to exist, most practitioners will be loth to adopt them in their practice or consent to dispense with alcohol in the treatment of their fever patients.

A great deal of valuable and necessary information is stowed away compactly in tables, most of which are taken from reports of the Experiment Station of the U. S. Department of Agriculture, on which the matter relating to different foodstuffs and their relative nutri-

tional value, contained in Part I, is chiefly based. The chapters on cooking and on the different kinds of food are very interesting reading.

In Part II, which more particularly interests the practitioner, the author displays a conservative adherence to the generally accepted principles of practice, notably in the chapter on typhoid fever, which is taken as the type of an infectious disease. The newer method of so-called "solid feeding," which is now advocated by some leading clinicians, is dismissed with the non-committal statement that as the evidence of the greater comfort and somewhat lower mortality among patients who are allowed some solid food increases, "material alterations will soon prevail in professional opinions, concerning nutrition in typhoid." The dietetic directions for diarrhea in infants are in accord with the latest teaching, as is the treatment of infant feeding in general, in the first portion of the book. In the chapter on diabetes, the author reflects the views of Van Noorden and the present conservatism in the matter of restricting carbohydrates in this disease. Good honest bread made of wheat flour is reinstated and the much maligned Irish potato again finds a place on the list of permissible vegetables, the length of which should go far toward reviving the drooping spirits of the diabetic and lessening the perplexing labors of his medical attendant.

The arrangement of the subject matter and the quality of the style deserve special commendation, while the editorial work and proof-reading leave nothing to be desired. An incomplete idea of the book would be conveyed by omitting to mention the dietaries and recipes contained in the last chapter. R. M. G.

THE MEDICAL DISEASES OF EGYPT. By F. M. SANDWITH, M.D., F.R.C.P., Consulting Physician to H. H. the Khedive and to Kasr-el-Ainy Hospital, Cairo; Lecturer at the London School of Tropical Medicine, etc. Part I. London: Henry Kimpton, 1905.

THE author in his preface states that while writing this book he has had in mind "the needs of three classes of possible readers—the Egyptian student of medicine, past and present, newly appointed English doctors who are suddenly placed in positons of responsibility in Egypt, without any knowledge of what sort of diseases they are likely to meet with among the natives, and the large and increasing number of colleagues in Europe and elsewhere who are interested in the behavior of medical diseases in foreign countries."

The book is intended not as a practice of medicine, but as a treatise on medicine as seen in Egypt; upon this subject the author

is especially qualified to write, for his twenty-one years' practical experience in Egypt gives him an intimate knowledge of disease as it exists in that country.

The present volume contains sections upon some of the infectious diseases. We presume, however, that there must be at least one more volume upon the infectious diseases, since in Part I there are no descriptions of such important conditions as tuberculosis, syphilis, pneumonia, malaria, and Asiatic cholera. Many of the affections that occur only occasionally in Egypt, among which it is surprising to find typhoid fever, are discussed with but a cursory notice. Reference is made to the larger text-books for full descriptions. More space is given to relapsing fever, infectious jaundice, and Mediterranean fever. At least one-half the book is devoted to discussions upon plague, bilharziasis, ankylostomiasis, and pellagra. These chapters are most interesting, not so much from the picture which the author gives of the disease as from the delightful and very full discussions upon the historical aspect, the epidemiology, and sociological problems concerned in their occurrence and presence in Egypt. His intimate knowledge of the works of Arabic physicians lends especial charm to the historical description.

To each chapter is appended a short bibliography covering at least many of the important papers upon the subject.

The arrangement of the book is bad. The two diseases bilharziasis and ankylostomiasis due to animal parasites scarcely follow in order after plague, while it is surprising to find pellagra considered among the definite infectious diseases. The book, however, is interesting and well written, serving to give a good idea of the prevalence and occurrence of certain diseases in Egypt. W. T. L.

PHYSICAL DIAGNOSIS, INCLUDING DISEASES OF THE THORACIC AND ABDOMINAL ORGANS. A MANUAL FOR STUDENTS AND PHYSICIANS. By EGBERT LE FEVRE, M.D. Second edition. Philadelphia and New York: Lea Brothers & Co., 1905.

DR. LE FEVRE'S book, which now appears in its second edition, is already favorably known as a standard text-book on physical diagnosis, particularly adapted by its size and scope to the needs of students. One special feature which distinguishes this work from most others of similar scope is the large share of attention devoted to questions of physics and physiology, and to the way in which the phenomena observed in the chest are influenced by physical conditions and forces. The student is thus taught to reason rather than to memorize and, since he acquires an intelligent knowledge of the production and modification of physical signs, is also

better enabled to appreciate their significance. It might indeed be objected that there is a little too much of this kind of theoretical discussion for a book of this size, were it not for the great educational value of such mental exercises to the student of science, and the tendency observed in many of the shorter text-books to sacrifice theoretical discussion and explanation to the demands of brevity. Such secondary factors as the tension of tissues and the physical properties of the bony structure of the thoracic cage apart from its contents, which have an important influence in modifying the physical signs, are particularly well brought out. If a criticism be allowable where there is so much to commend, it might be suggested that one important phase of the science of physical diagnosis, which cannot be too strongly impressed on the student, is perhaps not sufficiently emphasized in the present work. It is the relative value of the different methods of physical examination under varying circumstances and for the detection of certain definite conditions. The traditional order in which the various methods are usually given—inspection, palpation, percussion, auscultation—is, we think, in part, at least, responsible for this failure to appreciate their relative value, particularly in practical work. While no one will deny the importance of the first three methods, it is nevertheless true that auscultation yields the greatest amount of useful information and is, on the whole, the method most generally available and the one on which we most rely. This is especially true in children, at least as compared with percussion, and in the early diagnosis of pulmonary tuberculosis, one of the most, if not the most, difficult problems in the whole range of physical diagnosis. The importance of a thorough proficiency in the use of the stethoscope for accuracy in diagnosis, especially in dealing with cardiac conditions, might also have been given greater prominence.

The second edition follows the same lines as the first and is brought up to date by the addition of an appendix on *x*-ray diagnosis, with many excellent illustrations of radiographs from cases of cardiac and pulmonary disease. No mention is made in this part of the book of the excellent work which has been done recently in short-time exposures of the chest with high-power tubes and which gives so much more satisfactory results than can be obtained with the fluoroscope. R. M. G.

CLEFT PALATE AND HARELIP. By W. ARBUTHNOT LANE, M.S., F.R.C.S., Surgeon to Guy's Hospital, and Senior Surgeon to the Hospital for Sick Children, Great Ormond Street, London. London: The Medical Publishing Co., Ltd., 1905.

THIS monograph consists of a resumé of the various papers which the author has contributed to the subject of cleft palate.

His experience has been large and his opinions deserve the careful consideration of all surgeons. The first half of this pamphlet is taken up in a consideration of the development of the bones and cavities of the face. The author shows very graphically by text and illustration the disfigurements of the face resulting from a want of proper development of these bones and cavities. The greatest stress is laid upon the necessity of the early closure of the cleft between the nose and mouth: without such early closure the nasopharynx and its adjacent cavities never reach their normal development. He recommends operation for cleft palate as soon after birth as possible, believing that the day after birth is the best time: it is claimed that at this time little blood is lost and the child has not been reduced in strength by poor nutrition, as is so apt to follow in cases of cleft palate. If a harelip exist it is repaired at the same time, or as soon after as possible, never before the repair of the cleft palate.

The author's operation, as is well known, consists in taking a flap of mucous membrane and periosteum from one side of the cleft and dovetailing it between the mucous membrane and periosteum on the opposite side. He states most emphatically that the dangers of this operation in early life are much less than after the child has reached the age of two or three years. It is also claimed that operations at this period interfere much less with the development of the teeth than those done later.

It is our personal belief that many cases of cleft palate can be cured without operative procedure of any kind or with but slight operative interference. We are certainly convinced that when an immediate operation is not done, as advised by Lane, the parents of the child should be carefully instructed in the method of compressing the two maxillary bones together. If this is done two or three times a day it is wonderful how the cleft can be gradually narrowed or entirely obliterated. In order to be successful, of course, this treatment must be carried out persistently and conscientiously.

J. H. G.

A Text-book of Physiology, Normal and Pathological. For Students and Practitioners of Medicine. By Winfield S. Hall, Ph.D. (Leipsig), M.D. (Leipsig), Professor of Physiology, Northwestern University Medical School, etc. Second edition, revised and enlarged. Philadelphia and New York: Lea Brothers & Co., 1905.

In this book of something less than eight hundred pages the author has placed before his readers a large amount of information. The sciences allied to physiology, *i. e.*, anatomy, physics, chemistry, and

pathology, are taken up in a much more systematic manner than is usual in works on physiology. Thus brief anatomical and physical introductions are given before each chapter, and the latter parts of most of the chapters are devoted to a summary of the important pathological conditions found in the organs, the discussion of whose normal functions precedes. The reader is struck by the numerous divisions and subdivisions the author has used in his presentation. The work is not exhaustive, and owing to the brevity of the part dealing purely with physiology, some subjects receive less attention than they deserve, and it seems doubtful whether on this account the beginner would get at all times clear conceptions. The book, treating as it does allied subjects rather than confining itself to those of physiology alone, should find more use in the hands of the practitioner as a means of readily refreshing the memory than as a text-book for students, as the book does not follow the usual plan of instruction as taught in any one course in most medical schools. It is well printed and the illustrations are numerous and well chosen. G. C. R.

THE READY REFERENCE HANDBOOK OF DISEASES OF THE SKIN. By GEORGE THOMAS JACKSON, M.D., Chief of Clinic and Instructor in Dermatology, College of Physicians and Surgeons, New York; Consulting Dermatologist to the Presbyterian Hospital and to the New York Infirmary for Women and Children; Member of the American Dermatological Association and of the New York Dermatological Society. With ninety-one illustrations and three plates. Fifth edition, thoroughly revised. New York and Philadelphia: Lea Brothers & Co.

THIS new edition of Dr. Jackson's well-known manual of diseases of the skin contains a considerable number of new sections, almost all of which are devoted to the consideration of uncommon and, for the most part, only recently described affections. The term *tuberculide*, recently introduced by the French, and adopted by a considerable number of other writers to indicate a class of eruptions associated with, if not dependent upon, tuberculosis, is somewhat to our surprise omitted. The alphabetical arrangement of subjects is still employed, an arrangement which, while open to decided objection from a scientific point of view, is a very useful one in facilitating reference to any particular disease.

The additions to and alterations of the text bring the book well up to date, and it continues to be, as it has long been, one of the most useful among the smaller treatises, especially for the student.

M. B. H.

MINOR AND OPERATIVE SURGERY, INCLUDING BANDAGING. By HENRY R. WHARTON, M.D., Professor of Clinical Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Presbyterian Hospital and to the Children's Hospital; Consulting Surgeon to St. Christopher's Hospital, the Bryn Mawr Hospital, and Girard College; Fellow of the American Surgical Association. Sixth edition, enlarged and thoroughly revised. Philadelphia and New York: Lea Brothers & Co., 1905.

IT will be observed that the title of this book has been somewhat changed in this new edition, which is the sixth. This was thought advisable by the author because of the introduction of chapters on the emergency operations, which it was deemed well to incorporate. Excepting for these additions the rest of the work is little changed.

This work has always been a very popular one, and this revision, which brings it quite up to date, will result in its holding the place which it has so well maintained in the past. J. H. G.

LABORATORY GUIDE IN EXPERIMENTAL PHARMACOLOGY. DIRECTIONS FOR THE COURSE GIVEN IN THE UNIVERSITY OF MICHIGAN. BY CHARLES W. EDMUNDS, A.B., M.D., Instructor in Pharmacology in the University of Michigan, and ARTHUR R. CUSHNY, A.M., M.D., Professor of Pharmacology in the University College, London, and late Professor of Materia Medica and Therapeutics in the University of Michigan. Ann Arbor, Michigan: George Wahr, 1905.

THIS little volume is published primarily as a guide to the course in Experimental Pharmacology in the University of Michigan, and consists of over one hundred pages of text, interleaved for the purpose of notes by the student. There is first an explanation of the manner of preparing the armamentarium necessary for the experiments, with directions as to the anæsthetization of, and operation upon, the frog and some of the smaller mammals; this is followed by series of experiments on the chemistry of certain drugs, their solubilities, incompatibilities, and so forth. The hypnotics, chloral, sulphonal, and paraldehyde are considered and the effects of varying dosage on the frog noted. Nux vomica is treated in much the same way and its effect on the nervous system compared with that of Thujon. Like experiments with opium, curara, nicotine, caffeine and so on follow. Interspersed through the experiment on the various drugs are descriptions of such phar-

macological procedures as the making of pills and preparation of emulsions.

Although the book is purely a guide to the experiments described as its title states, yet it is far from uninteresting reading in itself. There are a number of cuts illustrative of the text. A. N.

INTERNATIONAL CLINICS. Edited by A. O. J. KELLY, A.M., M.D., Philadelphia, Pa. Vol. IV. Fifteenth series, 1906. Pages 312. Philadelphia and London: J. B. Lippincott Co., 1906.

GOTTHEIL presents a carefully thought over paper on psoriasis, taking a broad view on the subject. The original strength of the physiological saline solutions (0.75 instead of 0.9 per cent) is the method of choice and is supported by the arguments of Hallion and Camion. Gwyn offers a practical paper on the "Treatment of Some Chronic Gastric Disorders," based upon clinical reference, which shows that the statements of Deaver on page 116, "That the medical treatment of diseases of the stomach in man has been familiar for generations, and, as far as an unprejudiced surgeon can see, very few momentous changes have occurred in their medical treatment during this time," have by no means been borne out by facts. Too frequently the limited knowledge of a subject possessed by an author is assumed to be equal to that of an expert, particularly when some ill-digested but novel plans are proposed. Benedikt reviews the "Internal Use of Carbolic Acid" in a paper which is hardly in consonance with modern therapeutics. Psychotherapy receives brief attention from Ballet, solely with reference to some nervous disorders, in which it may prove of value. Hall has made a careful study of thirty patients suffering from empyema, with the result that while no new information is acquired the junior practitioner will find explanation for some of his failures. The decidedly rare "post-tissue suction" sign, indicating pulmonary excavation, is clearly expounded by King. We presume he intended to mention that the sound is more distinct if the cavity communicates with a bronchus. "Abdominal Palpation," by Thayer, is a plea for a more successful result, when the patient is in a special upright position; it is fully described and its advantages stated. Duckworth, without material addition to existing, knowledge, offers a readable lecture on the "Later Stages of Cirrhosis of the Liver." Brown on the ever-interestig thyroid gland and the newer studies on the parathyroids clearly defines our existing knowledge. Malta fever, of increasing interest to clinicians, receives careful attention, particularly with reference to the symptomatology and differential diagnosis, at the hands of Craig. The paper by Deaver has been alluded to. While he presents a strong plea for mechanical treatment, at the end

the force of his argument is decidedly weakened by the suggestion that the best results are obtained by conference between physician and surgeon—in fact, just what the physician has always believed. In the remaining surgical papers much of interest can be found, and the field covered is broader than usual. Ectopic pregnancy and pelvic hæmatocele are the subjects in obstetrics and gynecology by Ashby, Newell, and Lockyer. The final paper is on the "Medical Treatment of the Menopause," by Wilcox. Jullien publishes favorable results of the use of "Calomel Injections in Optic Neuritis of Syphilitic Origin," while pathology is well represented by Warthin, presenting an "Experimental Study of Roentgen Rays in Blood-forming Organs," with practical reference to leukæmia, and by Simon, who has studied eosinophilia. Taken as a whole, this volume is indeed a mine of information to the practitioner; its field is broad and the personality of the various authors impressive. Most of its contents are well worthy of the permanent form in which the various articles appear. R. W. W.

Die Palpablen Gebilde des normalen menschlichen Korpers und deren Methodische Palpation. 1. Teil. Obere Extremitat. By Toby Cohn, M.D. Berlin: S. Karger, 1905.

A protracted experience in massage convinced the author of the present work that the average physician is not sufficiently instructed in palpation and, being imperfectly familiar with the normal conditions as revealed by palpation, is not in a position to make the most of this useful method of examination in the practice of medicine. The work, of which the present volume is only a small part, is in effect a text-book of plastic anatomy, written from the viewpoint of the clinician instead of from the æsthetic standpoint, and therein differing from other text-books on the subject, which are designed for the use of artists. The upper extremity, which forms the subject of the present volume, is divided into fifteen regions. Each anatomical region is treated after a certain systematic manner: first, the boundaries and shape are described, then follows an enumeration of the structures contained in it: the integument, the muscles, bones, and finally the blood-vessels and nerves when these are palpable. The author confines himself strictly to normal conditions with only an occasional reference to such abnormalities as stiffened and tortuous arteries and the like. While the palpation of the arm no doubt affords excellent opportunities for practising this method of physical examination, the information gained in this particular region of the body is rather limited and of comparatively little value, particularly

to the internist, who will be more interested in the part devoted to the abdomen, when that portion of the work appears. It is to be regretted that the book is not more fully illustrated.

R. M. G.

INDIGESTION: THE DIAGNOSIS AND TREATMENT OF THE FUNCTIONAL DERANGEMENTS OF THE STOMACH. By GEORGE HERSCHELL, M.D. Chicago: W. T. Keener & Co., 1905.

ONE of the most sensible works on gastric disorders that have appeared in recent years, combining accurate knowledge of stomach disorders with great common sense in the treatment thereof. Very few things in the country have been more overdone than the "treatment of gastric disorders," largely owing to the specializing tendency of the age, and it pleases one's senses to read a work in which the recognition of "gastric neurosis" is so clear.

Perhaps, on the other hand, a tendency to associate a host of minor nervous symptoms with gastric disorders should be condemned, or at least considered as not proven (page 39).

True indigestion itself is given first consideration, and one can readily perceive that it is with actual non-digesting of food that the author is dealing with. Its many causes and phases are carefully taken up, and for one who wishes a full account of a disorder, usually so casually treated, we heartily recommend Dr. Herschell's book.

The neuroses receive their share of attention in special chapters. As regards hyperacidity, it seems a new idea that pyloric spasm is a natural endeavor to prevent the pyloric acid stomach contents reaching the duodenum; the advocating of proteid food unreservedly in these cases does not agree with many authorities who claim that such a diet provokes and keeps up the condition. The author also condemns frequent feedings in this disorder, a dietary proceeding usually followed by most authorities.

Septic stumps of teeth get more credit than they deserve, it seems, as producers of gas and fermentation and gastric disorders, since the organisms usually show that pyorrhœa alveolaris and such conditions are not remarkable for the amount of fermentation.

Gastric myasthenia is admirably discussed both as to diagnosis and treatment, especially intragastric administration of electricity, which seems almost a specific in many cases. Acute and chronic gout and mucomembranous colitis are definitely considered by the author as results of the chronic gastric condition. The application of the Weir Mitchell treatment to gastric myasthenia is unhesitatingly condemned, since the condition de-

mands local and dietetic treatment in addition to rest, and overfeeding would certainly aggravate.

Mrs. Rorer is outdone by the list of carefully described foods and their method of preparation which Dr. Herschell gives in the last chapter. N. B. G.

BACTERIOLOGY AND SURGICAL TECHNIQUE FOR NURSES. By EMILY M. A. STONEY. Second edition, thoroughly revised and enlarged. BY FREDERIC RICHARDSON, M.D., Illustrated. Philadelphia, New York, and London: W. B. Saunders & Co., 1905.

USEFUL in matter and attractive and serviceable in form the first edition of this book justified the expectation of succeeding issues. Revision, of which there was scant need, four new chapters, a glossary, and an increase by eighty of the total pages, is the feature of improvement in the second edition now under review.

The thirty line-drawings that illustrate the chapter on bandaging will clearly recall bandages taught by demonstration, but their failure to portray the steps of application render them inefficient to teach of themselves. In minor surgical procedures the instruction upon the use of heat and cold is lacking in essential details. An excellent epitome of obstetrical nursing as formulated by Dr. Hirst has the advantage of presentation in its original form. Hints upon the personal conduct of a nurse's life are in the main practical. The manual should prove serviceable not only to nurses but to hospital internes. J. M. S.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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General Principles of the Therapeutic Inoculation of Bacterial Vaccines as Applied to the Treatment of Tuberculous Infections.—A. E. WRIGHT (*Lancet*, 1905, ii., 1598). In previous communications Wright has been able to show that the blood fluids play an important part in phagocytosis. Quite distinct from the lysins, the agglutinins, and the antitoxins he has found a fourth substance present which prepares foreign bodies before the leukocytes can take them up. The presence of this substance is very easily demonstrable. If we make a mixture of a bacterial emulsion of normal salt solution, and of blood corpuscles, thoroughly washed so as to be freed from all serum, and incubate the mixture for fifteen minutes and then place it upon a slide and stain, we find that none or at least only a few of the organisms have been taken up by the leukocytes. If, on the other hand, we use blood serum instead of normal salt solution, so that we have a mixture of bacterial emulsion of blood serum and of washed corpuscles, we will find that after fifteen minutes' inoculation a very active phagocytosis has taken place. These substances in the serum, which prepare the bacteria for ingestion, Wright calls opsonins. By simple variations of the above experiments it has been shown that their action is upon the bacteria and not upon the leukocytes; that before combination they are thermolabile, but when once united with the bacteria the opsonic effect persists after heating to 60° for a long period of time; that heated serum cannot be reactivated by the addition of normal serum, so that probably no complement-like body plays a part in its action; that the blood of various individuals varies considerably in its phagocytic power, but in this variation the

leukocyte is practically a uniform factor, the differences being due to the content of the serum in opsonins. Wright has also devised a method for estimating the amount of opsonic power in a given specimen of serum, and although the accuracy of the method has been questioned, he and his pupils claim for it constant and precise results even within narrow limits.

According to Wright's views on immunity there are two forms of bacterial infection: (*a*) bacterial infections in which the machinery of immunization is inactive, and (*b*) bacterial infections in which this machinery is called into action. In one class of infections the opsonic power with respect to the infecting micro-organism hardly varies from day to day, remaining always inferior to that of normal blood. In another class of infections the opsonic power is continually fluctuating, the range of variations being from far below to far above the normal. These two categories of infections correspond respectively to strictly localized and systemic infections. In the localized, the low opsonic index was probably present before the infection, in the general, the wide variations are caused by periodic activity of the machinery of immunization called into play by the varying discharge of bacterial elements into the blood. These differences are no doubt fundamental, one type leading rapidly to death or recovery, the other often going on a lifetime. By vaccines we supply in the latter artificially a stimulation of the apparatus of immunization.

Wright uses in a very interesting way the estimation of the opsonic index of the blood, to determine the dose of the bacterial vaccines to be used and the proper time for injections. Although the results here given have been worked out in a similar manner for other diseases we shall refer only to the treatment of tuberculosis. For the inoculations Koch's T. R. or new tuberculin, which is a ground-up bacillus emulsion, was used. After an inoculation of tuberculin the resistance as measured by the opsonic power of the serum abruptly drops, this negative phase being followed by a positive phase when the opsonic index rapidly rises to a point far above normal. From this height there is again a rather abrupt drop and then a slow and gradual decline to the base line, or in some instances the opsonic power remains for a very long period at a point a little above its position before the injection. If the inoculation be repeated during the negative phase there is a cumulative action so that the resistance is driven down and down, but Wright has not been able to produce a satisfactory cumulative positive phase by injecting while the opsonic curve is rising. Wright believes that it is not necessary to produce constitutional disturbances in order to set the immunization machinery into action and that the capacity of the organism for immunizing response is not limited, but that this apparatus is easily stimulated and easily fatigued and we must guard with great care the demands we make upon it. He believes he obtains maximal immunizing responses from doses of tuberculin corresponding to from 1/1000 to 1/600 mg. of tubercle bacillus powder. If the negative phase be very well marked and tends to increase after each subsequent injection he thinks too large a dose is being given, whereas if the negative reaction becomes less intense after each injection he thinks the patient is making good progress. A second inoculation is undertaken only when the effects of the first have worn off.

This is a method we have at hand to increase the opsonins in the

blood stream, but, as has been shown in relation to other infections at the point of localized disease, the amount of protective substances is always less than in the general circulation. It seems evident that we could expect little benefit to a localized lesion if the serum in the general circulation possessed a low degree of resistance, but if its immunizing value be high, any method that would stimulate the local circulation and keep the area of infection bathed with a constantly renewed supply of lymph would be of marked value. Bullock has made the interesting observation that in a large number of lupus cases being treated by the Finsen rays, those who were doing well possessed a high opsonic index, those who were not improving, a low. Wright thinks the various methods of local treatment of tuberculous lesions, such as Finsen and *x*-rays, are useful only in improving local circulatory conditions and that they are probably of little value unless the serum has a high opsonic index.

The cases Wright has treated are principally skin and surgical tuberculosis. It would be too lengthy to view in detail his results, but he thinks they are encouraging and that his method is a very valuable addition to tuberculin therapy. By following the method carefully he believes many of the unsatisfactory results attending its use will be avoided.

The Importance of Syphilis of the Liver in the Diagnosis of Abdominal Tumors.—König (*Berl. klin. Woch.*, 1905, xlii., 137) cites three cases of syphilis of the liver to point a lesson in the difficulties of diagnosis. The first case, a man aged twenty-two years, was admitted complaining that for two years he had had paroxysmal attacks of colicy pain in the epigastrium, usually relieved by vomiting. Four months before admission he had noticed a tender mass in the abdomen which had gradually increased in size and become very painful. There was no history of syphilis. On examination a rounded, very tender mass was found below and to the left of the ensiform process, probably connected with the left lobe of the liver. He had no fever. The symptoms being severe and the diagnosis uncertain laparotomy was performed. The stomach and intestines were found normal. The left lobe of the liver was enlarged, firm, and covered with numerous grayish, slightly elevated, hard nodules. Microscopic examination of one of these nodules removed for diagnosis proved it to be a gumma. Subsequent to the operation the development of an interstitial keratitis and a chorioretinitis led to the diagnosis of hereditary lues.

The second case, a woman, aged twenty-eight years, had been treated in various hospitals for severe pain in the region of the stomach and liver. An enlarged liver and an abdominal tumor (kidney?) had been previously made out on the medical division. The upper portion of the abdomen was moderately distended by a large mass lying in the right hypochondriac and epigastric regions and extending to the navel. The great mobility of the tumor and its extension backward into the renal region left it a matter of doubt whether it arose from the liver or the kidney and what the nature of the tumor was. But the suspicion of its renal origin was so strong that at operation the abdomen was first opened in the lumbar region and finding the kidney normal, then in front. The mass thus exposed was as large as two fists and connected with the right lobe of the liver by a very much constricted base (Schnur-

lappen). Its surface was covered with round, slightly elevated, hard nodules, grayish red at the borders, with glistening-white retracted centres. The impulse to remove this lobe and so get rid of the growth was checked by finding similar masses over the rest of the liver. The patient recovered her health completely after inunction treatment.

The third patient who had previously been quite healthy, complained of having had pain in the region of the gall-bladder for four weeks with loss of appetite and slight emaciation. A mass was felt in the region of the gall-bladder leading to a probable diagnosis of gall-bladder disease. At operation a smooth rounded mass about the size of an egg was found at the free border of the liver connected with the right lobe. As the diagnosis still remained uncertain the mass was removed and on microscopic examination proved to be a gumma.

In the absence of a definite history of syphilis the diagnosis in such cases becomes very difficult. There are two forms of syphilis of the liver in which tumors may occur: a diffuse interstitial hepatitis in which irregular bands of connective tissue by contracting may leave prominent masses of liver substance often connected with the main lobe by narrow bands (Gestieltenlappen) and gummata. These two processes are frequently combined. The Gestieltenlappen may, as in the second case, be fairly independent and freely movable and often give one the impression of being kidney or gall-bladder tumors. Gummata are as a rule distinguishable as tumors within the substance of the liver itself. Considering the difficulty of diagnosis many of these tumors must come to operation—when carcinoma, tuberculosis, and sarcoma must be considered. If after the diagnosis of syphilis has been definitely made should the operator proceed to remove the diseased portion or sew up the wound and put the patient on antisyphilitic treatment? This question remains open. König thinks each case must be decided on its own merits. If the tumor can be easily removed, as in his third case, he believes it is often best to excise it.

Diabetes Insipidus and other Polyurias.—Although diabetes insipidus has been given a place as a distinct disease its definition remains obscure and unsatisfactory. It rests practically upon a single symptom whose etiology and pathology are not understood. It has been much discussed whether polydipsia or polyuria is the primary condition. It seems almost certain that some cases of hysterical origin do depend upon a primary polydipsia and it has been difficult to distinguish these from cases of polyuria. Whether the patient with diabetes insipidus retains water longer than the normal individual or passes it more quickly is still a discussed point. Buttersack considers tachyuria a sign of primary polydipsia. Observations purporting to show a continuous increase in the amount of urea and solids excreted would, if sustained, place the disease among the disorders of metabolism. The mass of available evidence, however, speaks against there being any change in metabolic function. The question of greatest interest, do the kidneys in diabetes insipidus functionate the same as normal kidneys, has not been satisfactorily answered.

Much light is shed upon all of these points by the investigations of Meyers (*Deutsch. Arch. f. klin. Med.*, 1905, lxxxiii., 1). He reports five cases of diabetes insipidus in which he makes the interesting observation that in these patients the concentration of the urine remains

practically uniform, and in order to regulate for changes in the output of solids the amount of fluid or the dilution is varied. The quantity of urine depends directly upon the amount of nitrogenous food and sodium chloride taken in. These features are strikingly illustrated in the first of Meyers' patients.

This patient, a typical case of diabetes insipidus, was passing on admission, from 12,000 to 13,000 c.c. of urine and drinking about 12 litres of water a day. Under a rigid diet devised by Tallqvist, from which nitrogenous food is almost entirely excluded, the amount of urine fell at once to 7600 c.c. and on the second day to 5900 c.c. Small amounts of milk and meat added brought the amount at once up to 8100 c.c., and upon such a restricted diet it varied from 7 to 10 litres but never went as high as on admission. After having determined by a number of other experiments this remarkable relation between the amount of urine and the character of the food the patient was again placed upon a rigid diet and on the first of September, 20 grams of sodium chloride were administered. The amount of urine increased at once to 11,250 c.c. and fell again the following day to 6600 c.c. The influence of the administration of 150 grams of meat is apparent in a second rise on September 10th. The special feature of the case, however, is that the concentration of the urine as determined by the freezing point is practically uniform. This concentration is very low—the urine is markedly hypisotonic and dissolves the patient's red blood corpuscles—but for the twenty-four hours the molecules and ions excreted equal the normal amount.

The second patient reacted in a similar manner to nitrogenous food and sodium chloride. Experiments on the phosphate metabolism showed that the increase in the amount of phosphate excreted did not increase the amount of urine. Twenty grams of sodium phosphate were administered, and although there was a marked increase in the amount of phosphate excreted the amount of urine and the molecular concentration remained practically constant, there being a sodium chloride retention to accommodate the increasing output of phosphates.

The third patient had diabetes insipidus complicating severe cerebral lues. Following the freezing point carefully, one finds that there was not complete loss of the ability to react with increased concentration, as values varying from 0.23 to 0.31 are found. This is brought out particularly well by collecting separately the urine from different parts of the twenty-four hours, when there is shown a fairly wide daily variation in concentration.

Case V is one of a mild grade of polyuria coming on during observation as a complication of another disease. Its advent was associated with a marked fall in pulse rate and blood pressure. It disappeared during an attack of facial erysipelas to reappear during convalescence. The power of the kidneys to yield a concentrated urine was less affected than in any of the other cases. After the administraton of salt the increased amount of urine was the principal reaction, but the freezing point was appreciably reduced and the percentage of sodium chloride increased.

In these cases sodium chloride and nitrogen or urea act as diuretics. To determine the action of drugs which ordinarily cause a diuresis by acting upon the parenchyma, theocin was administered. In Cases I, II, and III there was no increase in the quantity of urine but a distinct

lowering of the freezing point and a very marked increase in the sodium chloride excretion balanced partly by increased concentration, partly by nitrogen and phosphate retention. The day following there was a marked chloride retention and the amount of urine is proportionately decreased. In Case V, however, theocin is followed by an increase in the amount of urine, and while a larger quantity of sodium chloride is excreted, the total amount and the sodium chloride concentration remain practically unchanged. Theocin must cause changes in the kidneys having the same effect as the altered circulatory conditions under the influence of fever (Case V), namely, the excretion of a more concentrated urine.

The normal individual, as Meyers shows, by striking curves, reacts to an increased salt and nitrogen elimination with increased concentration and only secondarily with increased quantity. In diabetes insipidus patients the mechanism for producing a concentrated urine is damaged. This is the primary condition and the large quantity of urine passed is only a necessary consequence by which the solids are excreted.

As has been shown the degree to which this mechanism is damaged is very variable in different patients. Determining the reaction of the urine to diet and salt gives a ready means of distinguishing between cases of true diabetes insipidus and polyurias depending upon polydipsia. Meyers gives the records of a number of such cases, depending probably upon hysterical conditions, and shows that their urine reacts as in a normal individual with change of concentration as well as with change of amount. In cases of chronic interstitial nephritis with polyuria the same conditions hold good. The tables show a marked variation in amount and concentration without definite relation to the diet. It is true that the two conditions, namely, chronic nephritis and diabetes insipidus, do approach one another, and that the ability to secrete a concentrated urine is affected in both, but only in a slight degree in nephritis as compared with diabetes insipidus.

It seems definite clinically that these cases depend upon some nervous influence, and in all probability bear a close relation to a centre in the floor of the fourth ventricle, discovered by Claude Bernard and Ekhardt. In the second portion of his lengthy paper Meyers discusses views relating to the excretion of the various urinary constituents. The matter does not lend itself to brief abstraction.

SURGERY.

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An Inguinal Testicle and a Tumor of an Abdominal Testicle in a Woman.—MARION (*Annales des Maladies des Organes Genito-urinaires*, December 1, 1905) records a most interesting case. The woman,

aged thirty-six years, was married at twenty, but had never been regular. She appeared to be a well and normally developed woman, with long hair, large breasts and a feminine body. On examination with a speculum the vulva showed nothing abnormal: the pubis was covered with hair, the labia majora and minora were well developed, the clitoris was of normal dimensions, and the entrance of the vagina presented myrtiform caruncles or the remains of the hymen. On examination of the vagina with the finger, however, it showed only a depth of 5 to 6 cm. When the speculum was introduced the vagina, which was of normal calibre, was seen to end in a cul-de-sac, at the depth of which no trace of a uterine cervix could be seen. The examination of the tumor showed the pelvis to be filled with a round mass about the size of a fetal head, firm, easily palpated with the vaginal finger when the other hand was applied to the abdomen. The tumor was so fixed that no movement could be given to it. It was thought to be a fibroid developed on a uterus which was masked by an imperforate vagina. The patient presented also in the first inguinal region, above the labium majus, a small tumor about the size of a pigeon's egg. It was firm, non-fluctuating, and seemed to be a fibroid of the round ligament.

A median laparotomy disclosed a tumor which was easily lifted from the pelvis and attached by a lateral pedicle, which was ligated and the tumor removed. It was then discovered that there was no trace of a uterus or ovary. The abdomen was closed and the small mass in the right groin removed. This was easily isolated, and was attached by a moderately thick cord, analogous to the spermatic cord. In about a month the patient left the hospital, completely cured.

The inguinal tumor showed the existence of a tunica vaginalis and an epididymis. The chief of the laboratory on the following day asked why a normal testicle had been sent to him for examination. It was small in size. In view of the character of the inguinal mass the abdominal tumor was considered to be developed from an ectopic testicle in the abdomen. The microscopic examinations showed the inguinal mass to be a testicle, and the abdominal tumor to be an alveolar carcinoma, a uniformly epithelial tumor, possibly the endothelioma of the Germans.

Arthrectomy as the Method of Choice in the Treatment of White Swelling of the Knee.—LEBRUN (*Journal de Chirurgie*, November, 1905), referring only to tuberculosis of the knee in children, says arthrectomy ought to be the method of choice and should be done as early as possible:

1. When white swelling is present in cases of fungous non-suppurative arthritis or osteoarthritis.

2. In unopened suppurating white swelling, antiseptic intra-articular injections of iodoform in ether (10 per cent.) should be employed first; but if a satisfactory result is not prompt, one should resort to an arthrectomy as soon as possible.

3. In white swelling with fistulæ, arthrectomy will still be the method of choice, provided there are not extended and grave osseous lesions.

Lebrun insists on two points in his technique, to which he attributes great importance in the success of the operation.

1. In all cases he provides bilateral drainage, through two small openings, which are supplementary to the large incision used to open the joint. The large incision is carefully and completely sutured with

horse-hair. The drains are removed forty-eight hours after the operation, the object of the bilateral drainage being to prevent the accumulation of blood in the joint.

2. Before closing the joint it is dusted widely with iodoform powder. He then makes application with the thermocautery, brought to a dull red heat, to the whole surface of the joint, going into all the folds. In this way hæmostasis as complete as possible and complete drying of the effected surfaces are obtained. Moreover, the heat decomposes the iodoform and the iodine set free is very active, since it is in a nascent state. In this condition it attacks whatever remains of the tubercular tissue, and favors the production of fibrous tissue, which produces the cure.

The bloodless methods of treatment gave very few good results and then only in cases of tubercular hydrarthrosis. Arthrectomy, on the contrary, has been successful whenever tried and often rapidly. No recurrences after this method occurred.

Hæmaturia of Nephritis.—ALBARRAN (*Annales des Maladies des Organes Genito-Urinaires*, November 15, 1905), writing in the *Presse Medicale*, says that, until very recently, hæmaturia of renal origin was taken to indicate one of three conditions: cancer, calculus, or tuberculosis. We now recognize the so-called essential hæmaturias. The interest in the subject has been increased since Broca did an exploratory operation for hæmaturia, diagnosticated as unilateral, and found a kidney apparently otherwise sound. The patient was cured by this simple operation. Albarran has previously shown that almost always one could find an evident cause of the hemorrhage, sometimes a movable kidney, at other times renal retention, and what had not been recognized at that time, lesions of nephritis. Since then others have joined him, but recently the discussion has been reopened.

Albarran says that in contusions, cancer, tuberculosis, and calculus of the kidney lesions of nephritis appear, sometimes slight, at other times marked, which play an important part in the pathology of certain hæmaturias accompanying these diseases. It has long been known that they occur in acute nephritis, more or less masked by the symptoms of this condition. Acute nephritis sometimes supervenes in a case of chronic nephritis, as after a chill, the use of certain drugs, excess of alcohol etc., when the hæmaturia may be so severe as to demand immediate operation.

The chronic nephritis capable of producing hæmaturia may be classified into the chronic diffuse and the chronic partial nephritis. In the first the evidence depends upon clinical cases, autopsy cases, and those operated on, the list of clinical cases being interminable. Wagner, Weigert, Israel, Naunyn and others have established at autopsy evident lesions of nephritis which have caused during life hæmaturias more or less abundant. Surgical intervention, however, has given the best evidence, the operation often having been so urgent as to lead to fear for the patient's life, from loss of blood. The operated cases may be divided into those in which the lesion was double, and those in which the lesion appeared to be or was in reality unilateral.

Studied from the clinical point of view, the hæmaturia presents three different conditions. In the first group are the cases of Bright's disease in which some day hæmaturia appears and lasts a variable period, nearly always a long time. The diagnosis in these cases is

always easy. In the second group the hæmaturia precedes the appearance of the chronic nephritis by perhaps some years. There is a sudden large hemorrhage, and then the years pass with only one or two hemorrhages before the nephritis appears. Finally, in a third group the hæmaturia is the only symptom, without anything else to suggest Bright's disease. It is spontaneous without cause, it is not modified by repose or movement, the blood is habitually blackish and does not clot. The patient continues his ordinary way of living, although there is blood in the urine constantly for days, months, or years.

The cases of partial nephritis capable of producing hæmaturia may show small insignificant lesions, and yet the bleeding may be as violent as in those cases of diffuse nephritis. The demonstration of these lesions is due to the study of those kidneys operated on. During the operation the lesions may be detected, such as the adhesions of a perinephritis, depressions on the surface, blanched areas indicating sclerosis, or small cysts. But in some cases both macroscopic and microscopic examinations may fail to show lesions when they actually exist, as Albarran and Motz found in one case, operated on by Nicholich, of Trieste. The examination of the urine ought never to be neglected in these cases. Sometimes nothing abnormal will be found even in grave cases of double nephritis, as Israel has shown, but in others one observes, in the intervals between the crises, traces of albumin and casts.

From the standpoint of treatment much has been done by simple exploration, nephrotomy, and decapsulation in causing these abundant hemorrhages to cease. Sometimes this cessation is definite, at other times the arrest is more gradual.

Destroying the Urogenital Diaphragm or Pelvic Floor as a Means of Relieving Prostatic Ischuria; a New Operation.—ANDREWS (*Annals of Surgery*, December, 1905) objects to prostatectomy as a routine operation, because of its many deaths. Any operation of this kind is dangerous, a long series of cystotomies for instance, showing a regular percentage of deaths. Unless there is a crowding together of the walls of the prostate, as by the bones and ligaments of the pelvis, enlargement alone will not cause stoppage of the urine. It is because of such compression that the lumen of the urethra is encroached upon. Andrews would relieve this compression by freeing the prostate from its attachments and confinement under the pubic arch. He makes a curved incision through the skin and fat corresponding in direction to the pubic arch, after pushing up the testicles and holding them out of the way by a truss or binder. After pushing the vessels aside and dividing the suspensory ligament of the penis the cutting off of the deep fascia and part of the levator ani allows the membranous urethra and prostate to be brought into view by pulling on the penis. The puboprostatic ligaments are now in full view and are made tense by the traction. These are then divided when the prostate comes further into view. The pelvic diaphragm supporting the prostate is then cut along both lateral borders when the whole mass, including the prostate and neck of the bladder, falls freely backward and downward, almost as if they were herniating into a new position. Special precautions are taken against dividing the dorsal arteries, veins and nerves of the penis. The wound is then closed with only capillary drains in the angles. As a

result of this operation the prostate falls backward into a wider space between the bones, and the general result is a great loosening up of all the structures concerned in pressure on the neck of the bladder. Great relief of rectal reflexes and spasm result. The retroprostatic pouch is abolished and the bas fond becomes a true funnel, with its outlet at the lowest point.

The Law of Accelerating Risk in Cancer.—ANDREWS (*Annals of Surgery*, December, 1905) says that there is a mathematical law of growth and states it as follows: The risk of recurrence (or rate) in malignant growths increases as the square of the time of growth, or conversely the risk of recurrence, diminishes in the ratio of the square root of the time after incidence. Thus doubling the time increases the risk of recurrence or metastasis not twice but 2^2, or fourfold; tripling the time increases the risk 3^3, or ninefold; quadrupling the time increases it sixteenfold, etc. There is an early golden period in which the life iof the cancer patient may be saved.

The life history of any malignant growth may be divided into three periods: (1) The microscopic period. (2) The macroscopic period before metastases. (3) The period after metastasis, or the carcinosis period. Of the first we know nothing except by inference. Of the second we have abundant clinical evidence, and it is to this stage that radical surgery should be mainly limited. The writer described a "risk curve" plotted on a clinical chart, by which he determines certain limits, beyond which it is useless to attempt a radical operation. He has tested this method and has every faith in its accuracy.

The Use of X-rays in Carcinoma.—PUSEY (*Annals of Surgery*, December, 1905) says that all forms of epithelioma may be destroyed by the *x*-ray, with about equal readiness. There is a great variability in the resistance of different lesions. This is not so much a variation in the resistance of the various types of epitheliomas as it is a variation in susceptibility of the tissues of various individuals, for in the cases that are resistant the surrounding tissues seem to have as great relative tolerance as the diseased tissues. Carcinoma on the surface can, with practically unvarying regularity, be destroyed with *x*-rays and be replaced with healthy scar tissue. Concerning deeply seated carcinomas our facts are not so authentic. The writer reports one case of cancer of the breast, without involvement of the skin, with enlarged axillary glands and with spinal metastasis when *x*-ray treatment was begun. Postmortem examination showed that the breast was a mass of connective tissue without any carcinoma tissue remaining. The same was true of the axillary contents. In a similar case postmortem disclosed a similar condition in the breast, but the axillary glands were not affected by the *x*-ray treatment. This was probably the result of insufficient exposure of the axilla to the *x*-rays. The writer believes that any epithelioma that has not given metastasis and has not deeply involved the subcutaneous tissues may be converted into as healthy scar tissue as can be gotten after the excision of an epithelioma. As for permanency of results the cases will bear a fair comparison with those treated by any other method. If the removal of the contiguous glands is indicated the case should be treated surgically and not with the *x*-rays. One patient with carcinoma of the supraclavicular glands

and those in the axilla, and well on the down grade, regained her usual vigor after six months' treatment with the *x*-rays, and three years after beginning treatment she is in her normal, fairly vigorous health, symptomatically cured. In all operable carcinomas, except epithelioma, however, operation is preferable to the use of the *x*-rays.

Pusey thinks that the *x*-rays do not stimulate the growth of the cancer, nor increase the danger of metastasis. The histological findings show that the first thing noted is a degeneration and disintegration of the youngest peripheral cells. He has never seen metastasis develop while an epithelioma was under *x*-ray treatment, unless there was every reason to believe that metastasis was present when the treatment began. On the contrary he has seen metastasis escape, when there was much reason to fear its occurrence.

A Typical Disease of the Tendo Achillis.—SCHANZ (*Zentralblatt f. Chirurgie*, December 2, 1905) calls attention to an affection of the tendo Achillis of which he finds no mention in the literature. It follows excessive use of the tendon, and the patient complains of pain above the heel, chiefly in the use of that tendon, as in walking, riding a wheel, or skating. He exhibits limitation of the movements of the foot, lameness, and an outward turn of the toes in walking. The symptoms are more evident when the shoes are removed, and will be obscured by the wearing of high-heeled shoes. The patient locates the pain in the tendon itself and not at its insertion, as in disease of the bursa at the point, achillodynia or Albert's disease. The swelling is spindle shaped, begins above the lower end of the tendon, and disappears where the tendon joins the muscle. Schanz believes that the inflammation involves the tendon itself and not the tissue immediately surrounding the tendon, and that it is more frequent than disease of the bursa.

The treatment consists chiefly in preventing flexion of the foot and, therefore, stretching of the tendon. A broad strip of adhesive plaster is passed backward on the plantar surface of the foot from the toes and made to extend upward over the heel to the calf of the leg. Circular strips and a bandage then hold this in place. With a well-laced shoe and too low a heel the patient can usually go about without pain. In two or three weeks the pain and swelling will disappear.

Observations on the Use of the Jaboulay Anastomosis Button without Suture.—KLAUBER (*Zentralblatt f. Chirurgie*, December 9, 1905) says that one of the advantages of this button over that of Murphy is that it gives a more exact contact of the apposed serous surfaces. Since the difference in the diameters between the inner and outer cylinder in the latter is greater than in the Jaboulay button the opening necessary for the introduction of each half is relatively larger and the wrinkling produced by the purse-string suture greater. This interferes with the close approximation of the two halves. The larger diameter of the inner cylinder in the Jaboulay button is also of advantage in permitting the more easy passage of intestinal contents during the period in which it is in place. The diminution of metal mass makes the button lighter and, therefore, decreases the tendency of the recumbent position to retard its escape. On account of the narrowness of the retaining ring of intestinal wall drawn in by the purse-string suture,

there is some difficulty in holding the half button in position, but a little care will overcome this. That the adhesion of the serous surfaces is stronger and safer with the older button cannot be justly claimed, since with both buttons the compression area is only about 3 cm. from the outer edge. The inner half of the pressure ring quickly necroses, so that its width has little importance. The writer calls attention to the fact, however, that there sometimes persists a crevice through which intestinal contents can escape after the button halves have been brought together. In one case which he saw operated on this difficulty caused the operator to remove the button and to substitute another method of anastomosis. In one of his own cases, the same difficulty arising, he closed the crevice by a reinforcing circular suture, with a successful result. He says that this trouble comes from the too fine construction of the screw mechanism, by which the button is locked, so that an oblique articulation may result.

THERAPEUTICS.

UNDER THE CHARGE OF

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Thyroid Extract in Eclampsia.—R. W. LOBENSTINE draws the following conclusions from the literature of the subject and the results obtained in the treatment of six cases of eclampsia and threatened eclampsia by means of thyriod extract:

1. The extract undoubtedly lowers pulse tension and favors diaphoresis and diuresis, but in order to obtain good results large doses must be given and thyroidism rapidly induced. An early re-establishment and increase of the urinary secretion occurs. 2. Lange and Nicholson seem to think that the extract may have some specific action in eclampsia and the pre-eclamptic state, and that possibly by favoring metabolism it is able to counteract the effect of the toxins. 3. The author does not agree with Nicholson when he states that the re-establishment of the renal secretion is the one essential and all-important indication in treatment of eclampsia, yet since the kidneys are so deeply involved, and inasmuch as they can be influenced by treatment so much more readily than the liver, he believes in devoting as much attention as possible to the improvement of their condition. 4. The author advises against the use of the extract in the asthenic type of the disease. 5. The heart and pulse must be carefully watched. 6. The extract must be first in order to be of any value. 7. Since the heart muscle in

eclampsia is particularly susceptible, and since in some instances the thyroid extract might prove too depressing, the author advises moderate preliminary exhibition of heart tonics, such as caffeine or strophanthus, and finally states that he does not consider the administration of thyroid extract superior to other methods of treatment, but believes that it may prove of value in some subjects.—*Bulletin of the Lying-in-Hospital of the City of New York*, 1905, No. 3, p. 68.

A Specific Serum in Exophthalmic Goitre.—JOHN ROGERS has employed a serum made from the thyroid glands of exophthalmic goitre patients. The serum was prepared by grinding the glands to a pulp, extracting them with normal salt solution and straining off the coarse fibres. The resulting filtrate was then frankly acidified with acetic acid, a heavy precipitate of nucleoproteids resulting. The supernatant fluid was then siphoned off and half saturated with ammonium sulphate, which carried down the remaining nucleoproteids and the globulin, including the thyroglobulin or supposed active secretion of the gland. These precipitates were combined, and after removing the neutral salt on dialysis were to some extent injected while fresh into rabbits. The major part of the precipitate was dried for preservation. After five weeks of treatment the rabbits were bled to death and a serum which the author designates as serum A was extracted. Serum B was made later from the dried precipitate, which was dissolved in normal salt solution and injected into rabbits. Serum C was prepared in a similar manner, but later. Serum D, made from the normal thyroid, has not proved satisfactory. Ten subjects affected with exophthalmic goitre have been treated with serums A, B, and C, with a result of three apparently perfect cures, three rescued from a critical condition and are now approaching cure; the others are more or less improved. The doses of the serums were 5 minims gradually increased to 10 or 15 minims. Swelling and erythema may appear at the site of the injection. The remedy is one which must be used with great care, but seems to be capable of bringing about remarkable results.—*The Journal of the American Medical Association*, 1906, No. 7, p. 487.

Dechloridation Treatment.—C. MONGOUR considers that by prescribing a diet lacking in chlorides we are able to give great relief to patients suffering from dropsy, either cardiac, renal, or hepatic. The theory that the retention of chlorides causes dropsical conditions he explains as follows: The non-eliminated chlorides accumulate in the tissues and attract the water necessary to their dilution, consequently œdema appears as a result of this chloride retention. It must not be forgotten that before there is visible œdema in cardiac and renal disease there occur infiltrations of the viscera, constituting the pre-dropsical stage of Widal; that these infiltrations are present is proved by the abnormal increase in weight that these patients exhibit. The method of getting rid of this chloride retention and to prevent further accumulation is, naturally enough, to prescribe a diet lacking in chlorides. The ideal regimen is a strict milk diet. Milk contains about 22 grains of sodium chloride to the quart, and considering 3 quarts daily as necessary. the patient on this basis would receive about 70 grains of salt per day. Many patients, however, will not endure such a restricted diet; consequently the author advises one containing about 14 ounces of dark

meat and 16 ounces of bread made without salt, or instead of this about two pounds of potatoes, or a mixed diet of milk, green vegetables, and starches without salt. Coffee and tea or infusion of linden leaves and, if necessary, a little white or red wine. The author considers the dechloridation treatment one of the most important of the recent advances in the therapeutics of cardiac, renal, hepatic, and other dropsical disorders.—*Journal de Médecine de Bordeaux*, 1905, No. 48, p. 841.

Beer Yeast in Gynecology.—M. AUDEBERT has employed beer yeast in the leucorrhœa of pregnant women and has obtained excellent results. Of twenty-nine cases treated, twenty-six were cured and three were improved. Among them were instances of simple leucorrhœa, leucorrhœa with vulvitis, granular vaginitis, gonorrhœal vaginitis, vulvar vegetation and cervicitis. In only two cases was more than a month necessary to effect a cure. The author has also used yeast to disinfect the genital canal prefatory to operations. He has employed the dry yeast in obstetrics to the exclusion of all other antiseptics in the following conditions: marked vaginitis, premature rupture of the membranes, before various intrauterine operations, such as the introduction of bougies, bags, and forceps, and in postpartum hemorrhage. In no case did any complication follow delivery. He concludes if bacteriological evidence in favor of beer yeast confirms the clinical results this substance should furnish an excellent non-dangerous and non-toxic means of disinfecting the genital tract before accouchement and before gynecological operations. —*Revue Francaise de Médecine et de Chirurige*, 1905, No. 51, p. 1248.

Eucaine Lactate in Nose and Throat Operations.—T. J. HARRIS in a paper upon this subject states that eucaine lactate possesses the advantages over cocaine that it causes no hyperæmia, ischæmia, or shrinkage of tissues. If contraction is desired the eucaine may be combined with adrenalin. The author has used eucaine in about fifty instances in such conditions as septal deformities, tuberculous infiltration of the larynx, laryngeal papilloma, adenoids, hypertrophied turbinates, etc. In no case was there the slightest pain, discomfort, or toxic effect. The author considers that eucaine lactate is an excellent substitute for cocaine and may be employed in strong solutions without fear of toxic symptoms. It does not seem to lose its anæsthetic properties during the usual periods of office use. Its anæsthetic effect is hardly as great as that of cocaine; consequently in very painful operations it should be used in stronger solution, a 15 per cent. to 20 per cent. eucaine lactate solution being about equivalent to 10 per cent. solution of cocaine.—*American Medicine*, December 30, 1905, p. 1102.

Adrenalin in Therapeutics.—M. JOSUE states, as the result of experimentation, that he finds the lower animals less susceptible to the action of this substance than man, for while daily doses of $\frac{1}{10}$ grain, many times repeated, will cause untoward symptoms in man, a rabbit can take four times this quantity without inconvenience. Consequently in the author's opinion one should not inject hypodermically, in the human being, more than $\frac{1}{120}$ of a grain, and the latter dosage should be employed only under exceptional circumstances. The drug is less toxic when given by mouth, but it should nevertheless not be given

thus in larger dose than that indicated. In whatever way it is administered its use should not be continued for more than six days at a time, because of the cardiac or arterial difficulties which may ensue.—*La Semaine médicale*, 1906, No. 1, p. 8.

Scarification and Cauterization by Means of Zinc Chloride in Lupus.—J. LE CALVE recommends the following treatment: If there are adherent crusts these are softened by means of wet dressings, twenty-four hours before beginning the treatment; the diseased surface is then cleansed by means of soap, water, alcohol, and bichloride solution, and scarified in the usual manner; the hemorrhage is controlled by means of cotton moistened with 1:1000 mercuric bichloride solution and the scarified area swabbed over by an applicator holding a bit of cotton moistened with 10 per cent. zinc chloride solution. For the rest of the day the diseased surface is covered with a compress, but upon the next day it is exposed to the sun. The treatment is repeated at intervals of one week, and from it the author reports good results. It is particularly to be recommended when for any reason light treatment is impossible.—*Gazette médicale de Nantes*, 1905, No. 52, p. 1057.

PEDIATRICS.

UNDER THE CHARGE OF

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Treatment of Tuberculous Peritonitis during Childhood.—G. FALUDI (*Jahrbuch f. Kinderheilkunde*, 1905, Bd. lxii. S. 304) has collected three hundred and six cases of tuberculous peritonitis in children less than fifteen years old; almost half occurred between the ages of three and seven; the sexes were about equally represented; of autopsies on tuberculous subjects 16 per cent. were found to have peritoneal involvement. In doubtful cases he advises the injection of from 2 to 5 milligrams of tuberculin; he has never seen any ill results from it. Of seventy personal cases, observed between 1897 and 1902, forty-six came to laparotomy. He describes the method employed by him very carefully, laying stress upon the postoperative treatment with drugs (creosote, etc.), rest, good food, and good air. Sea air is the best invigorator known to him. Of his cases, twenty-seven (58 per cent.) belonged to the serous type of the disease; fifteen were cured, eight died. In this type of the disease he does not consider immediate operation absolutely necessary, excepting when the patient is not in a position to have other suitable treatment. If after medicinal-hygienic treatment no improvement occurs, or if the accumulation of fluid disturbs the respiration, operation is indicated.

He advises against tapping, as it has only a palliative value. In ulcerocaseous and fibroadhesive cases laparotomy is advised, and the earlier it is performed the better the chances of recovery; if the process is too widely spread operation will not cure. In intestinal obstruction operation is advisable, but often fails. If small fistulæ complicate the condition, operation is indicated and will usually cure; if the fistula is large conservative treatment will cure it ultimately. Grave tuberculosis elsewhere contraindicates operation; slight pulmonary, pleural, cutaneous or bony tuberculosis does not. Circumscribed peritonitis is rare in childhood and should always be operated on. Antituberculous after-treatment is very important.

Ovarian Tumors in Children.—A. M. WINTERNITZ and G. FINALY (*Jahrbuch f. Kinderheilkunde*, 1905, Bd. lxii. S. 402) report four cases of ovarian tumors in children: three of them were embryomata, one a simple unilocular cyst. All four patients recovered after operation. In three of the cases colicky attacks due to torsion of the pedicle were the first symptoms of the existence of the tumor. Constipation and vesical irritation existed in three of the cases; adhesions were not observed and ascites existed in only one case. None of the patients showed signs of early puberty. The diagnosis from appendicitis is difficult at times; in one of their four patients a diagnosis of appendicitis was made, the operation revealing the ovarian tumor; in this case the torsion had induced suppuration, the pus breaking through the anterior abdominal wall.

Treatment of Leukæmia with Roentgen Rays.—H. FLESH (*Jahrbuch f. Kinderheilkunde*, 1905, Bd. lxii. S. 293) reports the case of a boy thirteen years old. For two months he had been gradually developing the picture of typical leukæmia, his spleen reaching upward to the seventh interspace, two inches beyond the median line at the umbilicus, and down to the crest of the ilium. He had 2,870,000 red corpuscles, 230,000 leukocytes, and 40 per cent. hæmoglobin. After two weeks of ineffectual medical treatment Roentgen rays were employed. After forty-five sittings, during which the spleen, thigh, and sternum were treated for a total of eight hundred and forty-six minutes, the red corpuscles had increased to 5,100,000, the hæmoglobin to 90 per cent., and the leukocytes diminished to 14,000; the spleen had diminished in size to one-third of its original dimensions and the patient felt himself in perfect health. Some weeks later the symptoms returned rapidly, although the treatment had been continued constantly, and one day the patient collapsed suddenly, dying before a blood examination could be made. The postmortem blood examination showed a very large number of leukocytes as compared with red corpuscles, the proportion being 1 to 2 or even 1 to 1; 90 per cent. of these were lymphocytes. The patient evidently had suffered a transition from a myeloid to an acute lymphatic leukæmia.

Moser's Polyvalent Scarlet Fever Serum.—J. VON BOKAY (*Jahrbuch f. Kinderheilkunde*, 1905, Bd. lxii. S. 428) has employed this serum up to the time of reporting in twenty-one cases; seventeen recovered, four died. He finds that the serum injection improves the general condition favorably within twenty-four hours; this is noted whether the temperature falls quickly or slowly. The cerebral symptoms diminish

almost at once. The eruption pales quickly and visibly; in early cases the injection aborts it. The temperature declines quickly, averaging 2.1° C. during the first twenty-four hours in his seventeen cases; collapse symptoms were never observed. The pulse and cyanosis improve proportionately. The pharyngeal necrosis is always favorably affected; in only one case did it spread deeper. Of complications he noted glandular suppuration six times, otitis media three times; the kidney complications seemed favorably affected by the serum. Serum exanthemata were observed twelve times, but they were never of a grave type. He repeats his opinion, expressed two years ago, that Moser's polyvalent scarlet fever serum acts as an antitoxin in the scarlatinal infection.

Operative Treatment of Vesical Stones in Children.—The dangers and disadvantages of perineal section are so great that A. M. WINTERNITZ (*Jahrbuch f. Kinderheilkunde*, 1905, Bd. lxii. S. 387) has entirely discarded it in the operative treatment of bladder stones in children. He performs litholapaxy and suprapubic cystotomy together. The latter is the operation of choice in children under three, as the calibre of the urethra is too small for the passage of the lithotriptor; also in the presence of cystitis so grave as not to be improved by irrigation. In performing the suprapubic operation he does not consider it necessary to distend the bladder, as it rises a considerable distance above the pelvis and peritoneal injury is therefore almost impossible. The scar resulting from the operative wound never interferes with the urinary or sexual act, as is often the case where the perineum has been opened, and the interior of the bladder is much more easily explored. Drainage is not employed in the presence of normal urine and a healthy bladder wall; the wound is completely sutured and the patient is well after probably ten days; the prevesical space is drained for a few days and the abdominal wall sutured. A permanent catheter is never employed, because of the great danger of becoming clogged and the delicacy of the mucous membrane in children. When cystitis coexists the bladder is drained through the suprapubic wound by means of a suction drain, the wound being irrigated from time to time through it. The average duration of invalidism for these patients is 22.6 days. When litholapaxy could be employed (eighteen cases) the patients were perfectly well after an average of nine days. The indications for this operation, when no cystitis or pyelitis exists, are in the cases in which the urethra is sufficiently large to permit the use of the instruments and in which the stone is freely movable and not too hard.

Eclampsia in the Newborn.—T. MORI (*Monatsschrift f. Kinderheilkunde*, 1905, Bd. iv. S. 73) reports the case of the newborn child of a thirty-year-old primipara, who before the birth of the child had been complaining of headache, and had shown moderate albuminuria and œdema of both legs; on the third day the infant was suddenly taken with an eclamptic convulsion and died. The autopsy showed diffuse changes of the vascular system, particularly along the cerebrospinal axis, and parenchymatous degeneration of liver, kidneys, and adrenals. The author sees in this case a confirmation of the theory of Pestalozzi, who claims an ovular origin for the production of the poisons causing eclampsia. He expresses himself as doubtful whether albuminuric mothers should be permitted to nurse their infants, in the interest not only of the mothers but also of the children.

OBSTETRICS.

UNDER THE CHARGE OF

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Spontaneous Labor in a Patient Previously Delivered by Pubiotomy.—REIFFERSCHEID (*Zentralblatt f. Gynäkologie*, 1906, No. 18) reports the first case of spontaneous labor in a patient previously delivered by pubiotomy. The pelvis was contracted, the true conjugate being 7 cm. The first labor occurred in 1903 and was terminated by forceps, the child perishing. The mother had fever during her convalescence. The second labor occurred March 20, 1905, and was terminated by subcutaneous pubiotomy upon the left side followed by version and extraction. Mother and child made good recoveries. On March 30, 1906, the patient was again in labor, the cervix dilated and the head easily movable about the pelvic brim. As descent and engagement did not occur the operator introduced Gigli's saw, expecting to be obliged again to perform pubiotomy. The membranes were then ruptured and the child delivered by version and extraction without opening the pubes. The biparietal diameter of the child's head measured 9.5 cm., and mother and child made a good recovery. A skiagram of the mother's pelvis showed separation of the ramus of the pubes at the symphysis and also at the site of the previous operation.

Postmortem Cæsarean Section.—TUITLER (*British Medical Journal*, May 12, 1906) reports the case of a woman who died near the end of the eighth month of pregnancy from meningitis of two weeks' duration. As it was impossible to deliver the patient rapidly through the vagina, the abdomen was opened and the child extracted. It survived the mother's death and subsequently did well.

Bossi's Dilator in Premature Separation of the Placenta.—JOLLY (*Zentralblatt f. Gynäkologie*, 1906, No. 18) records twenty-five cases of premature separation of the placenta without a maternal death. Thirteen of the children were lost. In two of these cases Bossi's dilator was employed. The first of these was a multipara at eight months suffering from nephritis, with separation of the placenta and vigorous hemorrhage. Frommer's modification of Bossi's dilator was employed and in thirty-five minutes it was possible to empty the uterus. There were no lacerations. The second case was that of a primipara near the end of gestation suffering from nephritis. The Bossi-Preiss dilator was successfully employed and the uterus emptied by version. Jolly adds two other cases, the first of which was a multipara at term, who soon after the beginning of labor had a severe hemorrhage. The placenta could not be felt upon examination. Frommer's instrument was employed under anæsthesia and in twenty minutes version was performed. The cord had been wrapped about the child and the placenta

was almost entirely separated. The cervix was torn sufficiently to cause free hemorrhage which ceased when stitches were inserted. In the second of these cases there was hemorrhage for eight days at intervals, with no evidence of nephritis. The placenta could not be reached by examination and Frommer's instrument was employed. In twenty minutes it was possible to rupture the membranes and extract the child. A laceration 3 cm. long was found upon the right side of the cervix, which gave rise to free hemorrhage. This ceased when sutures were inserted.

Acute Yellow Atrophy of the Liver Occurring during Pregnancy.—Acconci (*Annale de Ostetricia Ginecologia*, 1906, No. 3) contributes a paper upon this subject in which he concludes that this condition must not be considered as a separate and definite disease, but as an introduction to an autointoxication peculiar to pregnancy. The severe form is characterized by rapid development of coma, while the milder form tends to amelioration and possible recovery. The pathological findings in these cases mostly resemble those of eclampsia. The parenchyma of the liver is affected in these cases and some of the symptoms observed result from disturbance in the circulation in that organ produced by parenchymatous changes.

Autointoxication: Its Relation to Certain Cardiovascular Disorders.—Battey Shaw (*British Medical Journal*, May 12, 1906) publishes in condensed form a lecture delivered before the Royal College of Physicians upon this subject. He has studied variations in blood pressure caused by the injection of kidney extract and also of substances derived from the liver and the brain. He concludes that kidney extract more than any other produces an increase in blood pressure. Extracts of the liver and brain show a much greater tendency to cause a fall of blood pressure of brief duration. Increased pulse tension, then, must draw our especial attention to kidney failure. These observations bear upon the diagnosis of toxæmia and threatened eclampsia. In two typical cases of the nephritis of pregnancy the writer obtained repeated tracings of blood pressure illustrating its remarkable increase. In some of the most virulent cases of toxæmia and eclampsia in proportion as the condition becomes grave blood pressure is diminished.

The Operative Treatment of Puerperal Pyæmia, with the Report of a Successful Case.—Cuff (*Journal of Obstetrics of the British Empire*, May, 1906) has collected six successful cases of puerperal pyæmia and adds the following case in his own experience. The patient had been attended by a midwife and gave birth to a large child and placenta without laceration of the perineum. Two days afterward a chill followed by profuse perspiration occurred, the temperature rising to 104.8°. The temperature not falling, the uterus was curetted and a few small shreds of placenta removed. The patient continued to have marked fever with sweating. Antistreptococcic serum was injected without benefit. A doughy lump about the size of the fist developed in the right iliac region in the upper part of the broad ligament. A mass the thickness of three fingers stretched from the uterine wall internally to the pelvic wall externally. On abdominal section the ovaries and tubes were found normal. Having packed off

the intestines with gauze the mass in the broad ligament was incised, revealing a thick bundle of thrombosed veins. These were ligated and the ovarian vein was found thrombosed and also tied. The peritoneal incisions were closed by catgut and the abdomen closed. The patient made a gradual recovery with fluctuations of temperature and pain in the left knee- and hip-joint. It is thought that the operation secured the patient's recovery by controlling the absorption of septic material from the thrombi.

Pyelitis in Pregnancy and the Puerperium.—CRAIGIN (*Surgery, Gynecology, and Obstetrics*, May, 1906) adds to his previous contribution upon this subject. His experience now embraces seventeen cases occurring during pregnancy and six during the puerperal period. Regarding etiology he believes that the pressure of the uterus upon the right ureter and kidney causes diminished vitality in the tissues which invites inflammation. The exciting cause is usually infection by the colon bacillus, often preceded by infection in the intestinal tract. The kidney substance is not primarily involved but may become so in severe and protracted cases. During the puerperal period the parenchyma of the kidney may become affected. The bladder is usually involved secondarily. In diagnosis pain and tenderness over the kidney and ureter, fever often accompanied by chill, irritability of the bladder, and acid urine with pus and usually the colon bacillus were present. In treatment the patient should lie as much as possible upon the side opposite to the affected kidney. Urotropin and large draughts of water should be administered. If the pyelitis fails to improve and the fœtus has reached viability labor may be induced.

One-child Sterility.—MATTHEWS (*Surgery, Gynecology, and Obstetrics*, May, 1906) found in one thousand consecutive gynecological histories eighty-two histories of one-child sterility. There were seventy-five histories of absolute sterility. In one hundred private cases there were fifteen of one-child sterility. In seeking for the causes of this condition the mother rather than the father was almost invariably at fault. It is not the result of congenital conditions such as anteflexion or contraction. The cause must be sought in something which occurred during the pregnancy or puerperal period. Gonorrhœa is a frequent cause acting through occlusion of the Fallopian tubes. Septic infection is next in frequency, while retroversion or retroflexion of the uterus is also a factor. Poor general physical condition with endometritis is found in some cases. Physicians should take especial pains in securing the proper hygiene for pregnant patients and in detecting and promptly treating gonorrhœa during pregnancy and the puerperal period.

Subchorial Hæmatoma of the Decidua.—HUTCHINSON (*Journal of Obstetrics of the British Empire*, May, 1906) had an opportunity to study seven cases of blood moles. From these he concludes that in these cases a pathological condition of the endometrium exists before conception. The ovum is less securely implanted than normally and hemorrhage into the decidua with thrombosis into intervillous space occurs with detachment of villi, compression of villi in greater or lesser extent, and interference with the nutrition of the fœtus. If the

embryo is young it dies and is completely or partially absorbed. If further advanced it develops imperfectly. Combined hemorrhage and thrombosis result in the development of a sac. There is no distinct evidence that the corpus luteum influences the development of the ovum.

GYNECOLOGY.

UNDER THE CHARGE OF

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Cancer of Uterus and Ectopic Gestation.—POKROWSKI (*Russki Vratsch; Zentralblatt f. Gynäkologie*, 1906, No. 16) reports the case of a patient, aged twenty-six years, who entered the hospital complaining of severe abdominal pains and profuse hemorrhage. On examination cancer of the cervix uteri was found, with a tumor the size of the fist in the right side of the pelvis. The patient stated that her last period had appeared at the normal time, six days after the cessation of which the flow reappeared, accompanied by severe abdominal pains.

The abdomen was opened and the tumor was found to be an ectopic sac, which was removed with the cancerous uterus and the opposite tube and ovary, the patient making a good recovery and being discharged on the twenty-fourth day.

Primary Cancer of the Vagina.—JAKUB (*Zentralblatt f. Gynäkologie*, 1906, No. 16) had a patient, aged forty-four years, who had been ill for five months with lancinating pains in the vagina and a bloody discharge. On the posterior wall of the vagina at the junction of the upper and middle thirds was a nodule the size of a walnut, above which there was a large ulcerating surface. Microscopic examination showed the presence of epithelium. The vagina and uterus were removed, a long oblique perineal incision being made. The operation lasted two and one-half hours, clamps being applied to the broad ligaments, and the wound plugged with gauze. The patient was discharged at the end of the third week.

Mechanical Irritation as a Cause of Cancer.—GOEBEL (*Volkmann's Samml. klin. Vorträge*, No. 403) after reviewing the literature on the etiology of cancer arrives at the conclusion that it is only in exceptional instances that a direct connection between the disease and mechanical irritation can be established. In these either embryonal tissue was present at the site of the lesion, or else the disease developed from cicatricial tissue. The writer attaches more importance to chemical irritation, but is uncertain whether this favors the proliferation of embryonic cells, according to Cohnheim's theory, or the growth of germs embedded in the normal tissue, as Ribbert holds. He rejects the parasitic theory, since all experiments have failed to cause the development of cancer through acute or chronic traumation.

OPHTHALMOLOGY.

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Determination of the Refraction by Means of the Inverted Image. LOHNSTEIN (*Graefe's Archives*, vol. lx.) suggests the possibility of measuring the refraction by means of the displacement observed in the inverted image as the object lens is moved from side to side. The inverted image becomes displaced with the lateral movements of the lens. The amount of such displacement depends upon the refraction of the eye under examination. Lohnstein takes for the point of departure with which to compare such displacement a visible point fixed in the anterior focal plane of the lens; this point will move coincidently with the movements of the lens. In emmetropia the fundus and the fixed point are displaced by the same amount; in myopia the point moves faster than the fundus; in hypermetropia it moves slower. The amounts of relative displacement serve to determine the degree of the ametropia.

Corneal Astigmatism and Central Myopic Choroiditis.—SENN (*Archiv f. Augenheilk.*, vol. xlviii.) demonstrates that corneal astigmatism and central myopic choroiditis are more frequent in the female than in the male sex. Of two hundred and five eyes affected with central choroiditis 78 per cent. were astigmatic. On the other hand, of one hundred and ninety-six eyes with myopia above 7 D. and without choroidal lesions there were 72.4 per cent. non-astigmatic.

These two reports clearly show the relations which subsist between astigmatism and macular lesions.

Vernal Catarrh in Turkey.—TRANTAS (*Archiv d. Ophthalmol.*, December, 1905) finds that this disease is more frequent in Turkey than in any other country (about 0.75 per one hundred eye patients).

It is much more common in males than in females, in the proportion of 9 to 10. Vernal catarrh is an affection of the warm season; thus of ninety-two cases reported, seventy-three occurred from May to September.

The cases recur from year to year for a number of years, six to eight. Saemisch, who first described the malady, observed a case which recurred for twenty-three years. The disease is practically always bilateral, although the two eyes may be quite differently affected.

The affection is localized in the tarsal conjunctiva of the upper lid (palpebral form), or at the limbus (pericorneal form), or more

frequently in both of these regions at once (mixed form). Complications are very rare; the resistance of the cornea is remarkable and this is one of the points of difference between it and trachoma which it greatly resembles. The great majority of cases occur between the ages of ten and twenty-five years.

The author further emphasizes a clinical sign, consisting of a number of white points developed deeply within the pericorneal swelling. This sign has not been mentioned before, although it occurs in a decided proportion of cases; when present it is a pathognomonic sign of vernal catarrh. Microscopic examinations by the author have shown that these cases depend upon either a degeneration of the epithelial follicles, which finally disappear and give rise to cystic cavities, or upon a degeneration of the epithelial covering which becomes an amorphous mass.

Demonstration of the Accommodation in an Enucleated Eye of an Infant.—HEINE (*Graefe's Archives*, vol. lx. p. 448) measured the static refraction of an infant's eye immediately after enucleation by skiascopy and found it the same as during life. The accommodation provoked by the induced current remained almost normal for ten minutes, even after a button-hole opening had been made in the eyeball. The experiment in imitation of that which Beer had made on the monkey's eye, proves that contrary to the theory of Helmholtz normal ocular tension is not necessary for the accommodation and that the accommodation does not modify the intraocular tension.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF
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Mycosis.—The etiology and treatment of mycosis occurring in the upper respiratory tract is the subject of an essay by Dr. JOHN SENDZIAK, of Warsaw (*Journal of Laryngology, Rhinology, and Otology*, November, 1905), to which has been awarded the prize offered by Dr. H. Holbrook Curtis to be competed for in 1905 by the members of the American Laryngological, Rhinological, and Otological Society. He discusses the following varieties:

1. Mycosis leptothricea, of which the causative agent is leptothrix buccalis.
2. Mycosis sarcinica, of which the causative agent is the variety of sarcina.
3. Actinomycosis, the causative agent being the actinomycoses.
4. Mycosis aspergillina, caused by various kinds of aspergillus.
5. Mycosis mucorina, the so-called black tongue, produced by certain varieties of mucor.
6. Mycosis oïdica, thrush, which is caused by the oïdium albicans.

This is a very complete summary of the subject, taking up some twenty-four pages of the journal, and is hardly susceptible of satisfactory abstract.

Pseudoleukæmic Tumor of the Pharynx.—Dr. Z. von Lenart reported to the Hungarian Society of Medicine of Buda-Pesth (*Revue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, November 11, 1905) a tumor the size of an egg in the upper part of the pharynx of a man aged forty years who had suffered for a year with progressive nasal obstruction and noises in the ear. It was of a bluish-red color, covered with smooth mucous membrane, and occupied the entire right nasal fossa and, in part, the left one likewise. Lymphatic glands were hypertrophied all over the body and the spleen was enlarged. The examination of the blood showed considerable increase of leukocytes, and the hæmoglobin equalled 70 per cent. There was no sign of tuberculous bacillosis. Histological examination of a fragment excised showed typical lymphoid tissue.

Saddle Nose.—In reporting to the American Medical Association a case of transplantation of bone for the relief of saddle nose (*Journal of the American Medical Association*, November 11, 1905) Dr. Cullen F. Welty, of San Francisco, reviews the subject of paraffin injections and plastic surgery for the relief of this deformity and decides in favor of the latter. In his own case he transplanted a section of bone from the crest of the tibia, with fair amount of success as to improvement in looks and complete success as a surgical procedure. Though this plan was original with Dr. Welty he unwittingly followed a device which had been satisfactorily practised before by Dr. Israel.

Suppuration in the Accessory Sinuses of the Nose.—Drs. C. J. Lewis and A. Logan Turner present (*Edinburgh Medical Journal*, November, 1905) a careful and thorough bacteriological and clinical research into this subject which deserves close study. They summarize their conclusions as follows:

1. That the organisms found in the healthy nasal cavities belong to the same varieties as those occurring in abnormal conditions of the nose.
2. That the pus obtained from some cases of antral suppuration may contain organisms similar to those occurring in the buccal cavity.
3. That occasionally bacilli distinctive of dental caries may be isolated from the pus of an antral abscess.
4. That the healthy accessory sinuses are probably sterile.
5. That there are three main types of organisms commonly met with in suppuration of the accessory sinuses, namely, streptococci, pneumococci, and staphylococci.
6. That in the cases of chronic suppuration streptococci were found in 80 per cent., whilst in the more recent cases they occurred in 60 per cent.
7. That the swabs taken directly from the affected cavities provide from the bacteriological standpoint more trustworthy results than swabs taken in the same cases from the nasal cavities.
8. That in recent cases virulent organisms are met with twice as often as in cases of chronic suppuration.

9. That clinical evidence supports the view that the antrum is more frequently infected by way of the nasal cavity, and that this opinion is corroborated by bacteriological investigation.

10. That nasal polypi occur more frequently in cases of associated sinus suppuration than in simple cases of antral abscess; their association with ethmoidal cell suppuration, whether occurring alone or as a complication of other sinus inflammation, is evident from the cases quoted.

11. That the recent cases of uncomplicated antral suppuration, as contrasted with those of a chronic type, respond more readily to treatment by lavage.

Radical Operation through the Alveolar Process for the Relief of Chronic Suppuration of the Maxillary Sinus.—PROFESSOR JURASZ, of Heidelberg, reports (*Verhandlungen des Vereins Suddeutscher Laryngologen*, 1904) three cases in which the alveolar opening was enlarged sufficiently to admit the little finger and permit thorough curetting of the sinus. A dental plate was worn as an obturator until the cures were effected. This treatment he deems especially adapted for cases of chronic suppuration of the sinus of apparently dental origin in which the hard palate is but slightly vaulted and the alveolar process is comparatively thin walled.

DERMATOLOGY.

UNDER THE CHARGE OF

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Pyroxalin in Dermatology.—ALLAN JAMIESON (*Edinburgh Med. Journ.*, May, 1905, p. 433) considers the virtues of this drug (which is oxydized pyrogallic acid) brought forward by Unna. It is prepared by oxydizing pyrogallic acid with a current of air charged with ammoniacal vapor. It is a black powder having many of the properties of pyrogallic acid, but is toxic and irritating. Jamieson has found it useful in psoriasis, keratosic eczema of the palm, tinea tonsurans, and sycosis, employed in 10 per cent. strength in ointment, or in solution in acetone.

The Value of Radium in Cutaneous Diseases.—DANLOS (*Bull. de la Soc. med. des Hôp de Paris*, February 10, 1905, p. 97) thinks the value of this substance is limited to certain diseases, up to the present time in his experience being useful only in tuberculous lupus, pearly carcinoma of the skin, and vascular nævi, and only where these diseases are limited in form. For extensive lesions it is inferior to the Roentgen rays.

Phototherapy in St. Goran Hospital, Stockholm.—MAGNUS MOLLER (*Monatssch. f. prakt. Derm.*, November 1, 1905, p. 449) reports his experience with this method of treatment in various diseases, including seventy-nine cases of lupus vulgaris, seventeen of lupus erythematosus, twelve of carcinoma cutis, three of alopecia creata, and one each of nævus vasculosus and acne rosacea. Not to speak of the excellent results obtained in lupus vulgaris the results were favorable in the infiltrated form of lupus erythematosus (the lupus erythematosus discoides of Kaposi), while but slightly beneficial results followed its use in the superficial forms. In alopecia areata, acne rosacea, and nævus vasculosus distinct improvement took place.

The Action of the Finsen Light on Normal Skin.—F. VON VERESS (*Monatshefte f. prakt. Derm.*, vol. xl. p. 430), from experiments made, concludes that symptoms of acute inflammation are produced, including œdema, blebs, dilatation and thrombosis of the bloodvessels, emigration of leukocytes and lymphocytes; secondly, as to the lesions, vacuolization of the epithelial cells and of the giant cells, degeneration or necrosis of the epithelium, hemorrhage and hyaline degeneration; thirdly, reactionary symptoms composed of proliferation.

Case of Pemphigus Neonatorum Gangrænosus.—W. T. FREEMAN (*Brit. Journ. of Derm.*, October, 1905) states that in the infant there were no symptoms pointing to syphilis as the cause. At birth the infant was said by the midwife to have no skin on the feet and legs, but the presence of blebs with hemorrhagic contents over the general surface permitted the diagnosis of pemphigus. Death occurred on the fourth day, by which date some of the blebs had dried up, others had ruptured, leaving patches of blood-stained corium, which soon took on a gangrenous form. Nine parts out of ten of the eruption existed at birth. The author inclines to the view that the cutaneous manifestation is but a peripheral expression of a widespread central nervous lesion and that the epidemics, if such there be, are caused by a secondary infection of the contents of the vesicles.

The Organism of Dermatitis Coccidioides.—S. B. WOLBACH (*Journ. of Cut. Dis.*, January, 1905) studied a case in Boston, in which the lesions were subcutaneous and situated on the head. The patient had lived in California and Mexico and had travelled much abroad. Cultures of the fungus resembled young colonies of oidium lactis, and consisted of a mass of coarse, branching, here and there segmented, mycelia, with a distinct membrane. Old colonies showed an aerial hyphæ-bearing gonidea and spherical bodies resembling those met with in the tissue. The author states that the organism cannot be considered a blastomycosis.

Multiple Benign Sarcoid.—C. BOECK (*Archiv f. Derm. u. Syph.*, January, 1905) again calls attention to this disease, which he first described in 1899. Five new cases are referred to. The disease is usually papular or nodular, the lesions being usually multiple, the size of a pea or bean, reddish blue or brownish yellow in color, and generally seated on the face. While clinically they resemble somewhat tuberculosis the course of the disease is different, the lesions being

amenable to the internal use of arsenic. Injections of tuberculin do not cause any local reaction. Sometimes the lesions assume a diffuse form.

On Mycosis Fungoides.—ALFRED BRANDWEINER (*Monatsh. f. prakt. Derm.*, November, 1905) describes an unusual case of this disease, and in particular discusses the subject of metastasis. Tumors composed of reddish-yellow nodules, varying in size from a hazelnut to a small apple, were found in the brain. There were no changes observed in the spinal cord. He concludes that this is the first case in which it has been shown that metastasis occurred in the brain; that the histological examination proved that the cells of mycoid tumors do not arise from connective tissue, and that in the light of existing knowledge there is no ground for considering the manifestations of this disease as metastasis of leukæmia, as has been asserted.

Contagion of Leprosy in the Light of Science.—ZAMBACO PACHA (*Annales de Derm. et de Syph.*, May, 1905, p. 460) discusses this important question at length, and believes that it is not properly understood, for the reason that the world is of the opinion that it was extinguished in Europe and that its revival is to be attributed to new importations from leprous countries. In reality, owing to the better hygienic condition of the present time, and causes other than this, leprosy is diminishing by degrees and is tending to disappear. Granted that the bacillus appears to be the principal factor in leprosy, it should not be disregarded that it is insufficient in itself to account for leprosy. The disease ravages those countries where even the strangers are not spared, whilst in another country leprosy is not propagated by those who have contracted the germ in the active centre of the disease. The decadence of the virulence of the bacillus is incontestable, not only for leprosy but also for cholera and plague. The bacillus of leprosy can be wanting or is not demonstrable in certain cases, and the clinician may be able to make the diagnosis against the conclusions of the bacteriologist. Zambaco thinks that the disease is showing no tendency to actual increase, especially in Central Europe.

A Case of Autochthonous Leprosy in the United States.—O. ORMSBY (*Annales de Derm. et de Syph.*, May, 1905, p. 460) relates the case of a man born in Iowa who was the subject of unquestionable tubercular leprosy. His father was a Norwegian, who came to the United States at the age of ten years, and who was probably leprous; he had a sister and probably a brother who were also leprous.

Subcutaneous Injections of Chaulmoogra Oil in Leprosy.—TOURTONLIN BEY (*Monatshefte f. prakt. Derm.*, January 15, 1905, p. 88) states that this method of treating leprosy is distinctly useful if not curative. Other clinicians have also used and reported on Tourtonlin's method, to which he directed attention in 1894. Improvement in some cases follows the fifth injection. The disadvantages of the treatment are that the injections may be painful and may cause elevation of temperature or even pulmonary embolism, but the latter accident is rare. As a rule about five grams are injected, this dose to be repeated every few days or as may be advisable. The remedy, it would seem

from the experiments made, has the power to keep the disease in subjection if not to cure, and hence must be regarded as valuable. The treatment is slow, occupying months or, more often, years.

On the Pathology and Treatment of Leprosy.—Rost (*Brit. Med. Journ.*, February 11, 1905, p. 294) discusses the culture of the lepra bacillus and the production of its antitoxin. The injections of the product (so-called "leproline") caused in lepers an active febrile reaction, a rapid disappearance of the patches devoid of color, and the cure of the ulcerations. In the anæsthetic areas and regions sensibility returned immediately. Amelioration of symptoms followed in all cases promptly, and in four cases there was complete cure of the disease, and in one case after a single injection. The remedy is an extract analogous to the tuberculin of Koch.

Frambœsia Tropica.—Hengler (*Dermatologische Zeitschrift*, September, 1905, p. 602) gives an interesting article on this disease as met with in Sumatra. He differentiates it very clearly from syphilis (with which disease it has often been confounded). It is a contagious, infectious, autoinoculable disease, with an incubation period and with a great variety of general and local symptoms, the cutaneous being very marked, distinctive, and frequently severe. Potassium iodide and Zittmann's decoction of the woods prove valuable, and sometimes mercury is useful. The chief interest in the paper is its clear separation from syphilis. Its cause is not known.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Latency of Tetanus Spores in the Animal Body.—Tarozzi (*Cent. f. Bakt. u Parasit. Orig.*, 1906, Bd. xl. p. 451) injected subcutaneously into rabbits modified cultures of the tetanus bacillus containing spores, and found that the tetanus bacilli passed into the blood and were carried to the various organs, where spores could be demonstrated long after the original dose was given. The spores were found most frequently in the liver and there they remained longest. They were not numerous, but could be demonstrated by making cultures from small bits of the organ. Not only were these latent spores visible, but they produced toxin in cultures sufficient to kill rabbits in 1 to 1.5 c.c. doses and guinea-pigs in smaller amounts. The question then arose as to whether it was possible for the spores remaining latent in the body to multiply

and give rise to toxic symptoms. Experiments on rabbits previously injected with weakened tetanus culture showed that if by some means, such as the injection of lactic acid, necrosis of tissue was produced, the animals died with tetanic symptoms. At autopsy many tetanus bacilli were found in the necrotic tissue of the organ injected. The author believes that under these conditions the spores find a suitable medium in the necrotic material for growth and hence produce toxins. He suggests that the so-called rheumatic or spontaneous tetanus in man may be due to the lighting up of a latent infection acquired long prior to the onset of the tetanic symptoms.

Newer Clinico-bacteriological Experiences in Typhoid and Paratyphoid Fever.—BRION and KAYSER (*Deutsches Archiv. f. klin. Med.*, 1906, lxxxv. p. 525) report their experiences with a series of two hundred cases of typhoid and paratyphoid fever. The results of their studies of agglutination reactions and of cultures from the blood, stools, and urine are given. In their agglutinations they consider a reaction of the organisms to the serum in 1:100 dilution as positive. Both macroscopic and microscopic methods were used.

In typhoid fever they obtained a positive agglutination with typhoid bacilli in 50 per cent. of ninety-one cases tested on the eighth day of disease, 84 per cent. of one hundred and twenty-one were positive when tested on the fifteen day, and 95 per cent. were positive on the twenty-second day of the disease. This well shows how the value of the agglutination test as a means of diagnosis increases as the disease progresses. The earliest successful agglutination was on the third day, when three cases reacted positively. In one hundred and thirty-eight positive agglutinations of the typhoid bacillus a group agglutinin was present for the paratyphoid bacillus in about 10 per cent., and for the β-type of paratyphoid bacillus in about 8 per cent. of the cases. Group agglutinins were also found present in infection with both types of paratyphoid bacilli. Mixed infections were ruled out by the isolation of the infecting organism and by absorption experiments. The authors' investigations upon group agglutinins show that by the microscopic method the serum usually agglutinates the infecting organism in higher dilutions than it does the other members of the group, although at times the group agglutinins may be more powerful than the specific agglutinins.

The authors report two cases which gave a positive agglutination for typhoid bacilli in 1:100 dilution, but which clinical, bacteriological, and in one case autopsy findings showed to be infections with other organisms. They also report seven cases which were not typhoid fever clinically but which gave positive agglutination reactions. Two of these cases were in healthy colleagues who had to do daily with much typhoid material. In these cases a latent infection is considered as possible.

Blood cultures were made in one hundred and eighteen cases of typhoid fever. These were successful in sixty-four, or about 55 per cent. of the cases. During the first week of the disease 94 per cent. of the cases were positive, during the second week 70 per cent., and during the third week typhoid bacilli were obtained in 54 per cent. of the cases. The organisms were obtained from the blood eight times

before the agglutination became positive. They were obtained twice on the third day of the disease. The authors consider that no prognostic conclusions can be drawn from the results of blood cultures, although as a rule the blood of the more severe cases contain the greater numbers of organisms.

In their bacteriological examination of stools they found that during the first week of the disease bacilli were obtained in seven cases, only one of which gave a positive agglutination reaction. The organism was found to increase in numbers in the stools, usually gradually, as the disease progressed. At the end of the first week of the disease 32 per cent. of the cases showed the typhoid bacillus in the stools; at the end of the second and third weeks 35 per cent. and 45 per cent. respectively. Of one hundred and fifty-four patients convalescent from typhoid fever 93 per cent. failed to show the bacillus in the stools after fifteen days of normal temperature, while in eighty-four cases the urine was also bacillus-free under the same conditions.

Typhoid bacilli were found in the urine of 25 per cent. of twelve cases examined between the second week and the fortieth day of the disease. The authors found the typhoid bacillus in the stools of six healthy persons, three of whom had never had typhoid fever, but had been intimately associated with typhoid fever patients. The other three cases had had typhoid fever seven, ten, and thirteen months previously. All were women.

In cases that were typical clinically and in which blood cultures and agglutination tests were negative the bactericidal properties of the patient's blood, as suggested by Pfeiffer, sometimes revealed the cause of infection. The authors encountered nine paratyphoid infections in this series of two hundred cases, or 4.5 per cent. of the total number. Seven of them were of the β type and two were of the a type. After they had completed their series of two hundred cases they encountered a β type of paratyphoid infection, from which the organism was obtained from the circulating blood in pure culture on two occasions. It terminated fatally on the eighteenth day of the disease and is reported with the autopsy findings. Typical lesions of typhoid fever were found, including ulcerations of Peyer's patches. At the autopsy only the β-paratyphoid bacillus was obtained from all the organs, including a small number from the ventricles of the brain and spinal fluid.

One of the cases of a-paratyphoid infection presented a very interesting course. On the tenth day of disease the serum agglutinated the a-organism in 1 to 500 dilution, while the typhoid bacillus was agglutinated only by a 1 to 50 dilution. Only a-paratyphoid bacilli were obtained from the stools. On the forty-first day a-paratyphoid was agglutinated at 1 to 50 dilution only, while both β-paratyphoid and typhoid bacilli were agglutinated at 1 to 100 dilution. On the sixtieth day of disease the a-paratyphoid organism was agglutinated by 1 to 100 dilution, β-paratyphoid by serum diluted 1 to 500 and the typhoid bacillus by serum diluted 1 to 1000. Typhoid bacilli were obtained from the stools and several times from the urine after the sixtieth day. The authors discuss the significance of these findings and favor the idea that a secondary infection with the typhoid bacillus followed an infection with the a-paratyphoid bacillus.

Occurrence of Meningococci in the Nasal Cavities.—GOODWIN and VON SHOLLY (*Journal of Infectious Diseases*, 1906, Supplement No. 2, p. 21) give the results of an extensive bacteriological study of the nasal cavities of patients suffering from epidemic cerebrospinal fever and of persons in contact with such patients.

The authors made cultures from fifty-two cases of meningitis. Of these twenty-two were examined during the first week of the disease, and from twelve cases the meningococcus was isolated. Five positive cases were obtained from fifteen examined in the second week. All later cases were negative except in a severe case where the organism was obtained on the sixty-seventh day of disease. An examination was also made of the nasal secretions of forty-five healthy persons living in close contact with the disease, and from five the meningococcus was obtained. In all of these cases the persons had been intimately exposed, living in the same room with a patient during the first two weeks of the disease. The nasal secretions of fifty-five unexposed first year medical students were examined as a control, and from these in two cases an organism was isolated agreeing perfectly with the meningococcus culturally and in pathogenicity, but showing difference in agglutination reaction.

The cultures were made by removing mucus from the nasal fossæ by sterile cotton swabs and smearing it on plates of ascitic agar.

The organisms were tested by practically all the cultural methods, animal inoculation, agglutination and absorption experiments. Micrococcus catarrhalis and similar organisms were carefully excluded. From their results the authors conclude that as the meningococcus was present in the nasal secretions of about 50 per cent. of patients with meningitis which they examined during the first two weeks of the disease, and in 10 per cent. of healthy persons in contact with these cases, their findings indicate that it is very important to isolate cases of epidemic cerebrospinal meningitis, at least during the early weeks of the disease.

Examination of the Blood for Tubercle Bacilli by Hydrohæmolysis.—NATTAN-LARRIER and BERGERON (*Journ. de Physiologie et de Path. gen.*, 1905, vol. vii. p. 1028) advocate their method of hæmolysis by water as the best-known method for finding tubercle bacilli in the circulating blood. They put 100 c.c. of recently distilled water into two sterile flasks, to each of which is added 5 c.c. of blood drawn from the arm vein. The flasks are then shaken three or four minutes and a fluid devoid of fibrin or coagulum is obtained. The fluid is then centrifuged and the sediment spread on slides and examined or it may be put upon culture media by means of sterile pipettes. Twelve parts of water to one of blood may be used in animal experiments instead of twenty to one, when human blood is employed.

This method was used by the authors in a series of experiments. They injected into the ear veins of rabbits emulsions of tubercle bacilli and then examined the blood for the organism. They found the organism in the blood fourteen out of fifteen times during the first five days after inoculation, but only twice was the search successful after five days had elapsed: once on the seventh and once on the ninth day. They were able also to grow the tubercle bacilli from the blood by their method.

The authors state that their procedure does not deform the tubercle bacilli, a fault which may be found with some of the other methods.

Bacteriology of Whooping-Cough.—DAVID J. DAVIS (*Journal of Infectious Diseases*, 1906, vol. iii. p. 1) carefully reviews the existing conceptions in regard to the etiological role of various micro-organisms in whooping-cough. Although there is great lack of unity in results arising chiefly from a diversity of methods, the author believes that practically all modern investigators have been dealing either in pure or in impure cultures with the influenza-like bacillus first described by Sprengler and later by Jochmann.

Davis made bacteriological examinations of the sputum of eleven cases of pertussis and was able to isolate an organism which he could not differentiate from the influenza bacillus in fifty-six cases, or in 92 per cent. The organism showed a low degree of virulence for laboratory animals, although a general bacteræmia and death were produced when large amounts of the organism were inoculated intraperitoneally. The virulence was increased when inoculated with non-virulent strains of staphylococcus pyogenes aureus and other organisms. This symbiotic effect the author considers quite important in the etiological role of the organism.

Inoculation of the throats and nasal cavities of monkeys had no effect. The organism obtained from pertussis cases was smeared on the tonsils and nasal mucosa of a healthy young man and a definite reaction followed. About forty-eight hours after inoculation the patient had chilly sensations, a cold sweat, som · headache and weakness, and his temperature rose to 100.2° F. The febrile reaction continued for about two days. This was followed by a somewhat indefinite pharyngitis with cough for about four weeks. The cough was not, however, spasmodic and whooping did not occur. This experiment proves, the author thinks, that this influenza-like organism is at least not always a harmless saprophyte.

The throats of numbers of patients suffering usually with the diseases of childhood were examined, and a similar organism was found in from 18 to 80 per cent., varying with the disease. It was also isolated twice in cultures from the throats of twenty healthy medical students. The author believes that this bacillus cannot as yet be sufficiently differentiated from the influenza bacillus to warrant another name for it.

Although Davis considers that evidence at hand will not permit a definite statement for or against the specificity of the organism for whooping-cough, it is certainly very frequently found in the sputum of whooping-cough patients, especially during the spasmodic stage of the disease. It has been found several days before the whoops began and as long as six months after the disease. The work, together with that of Jochmann, Wollstein and others, certainly suggests that the final solution of the cause of whooping-cough will be found in the group of organisms to which the influenza bacillus belongs.

Multiple Non-inflammatory Necrosis of the Liver.—OERTEL (*Journal of Experimental Medicine*, 1906, vol. viii. p. 103) describes a peculiar type of necrosis of the liver which he has observed four times in two hundred and seventy-five autopsies. In the gross the liver appears

pale, the markings are lost, and the surface presents circumscribed deep yellow or hemorrhagic spots and streaks. Microscopically, irregular areas sometimes forming streaks were seen, in which the liver cells were destroyed. The necrosis was general. The distribution of the single areas varied, sometimes being found about the central vein of the lobule, sometimes about the periphery. In these foci, which were often circumscribed, but at times had no definite margins, the liver cells presented various grades of necrosis without inflammatory reaction. The outlines of the cells were well preserved. The nucleus showed all stages of fading to complete disappearance. The cells contained many bile granules and fat droplets. In the areas where the process was more advanced the liver cells had undergone complete dissolution, leaving only a shadow or an empty space with the surrounding reticulum. In all the cases there was more or less portal sclerosis. The condition differs altogether from the ordinary parenchymatous degeneration or coagulation necrosis of cells. The author excludes a postmortem change and suggests that the necrosis is caused by an autolysis of the liver cells; and since the lesion cannot be classified with the known forms of necrosis of the liver, it must be considered as a new type hitherto undescribed.

Changes in the Pancreas in Cirrhosis of the Liver.—Lando (*Zeit. f. Heilk.*, 1906, Bd. xxvii. p. 1) has studied the pancreas in twenty-three cases of cirrhosis of the liver. In most instances the cirrhosis was of atrophic type and in fifteen cases there was a history of alcoholism. Diabetes was present in three instances. The pancreas in all cases showed more or less overgrowth of connective tissue which in twelve cases was about proportionate to the cirrhosis of the liver. The pancreatic cirrhosis was at times entirely intralobular and confined to the interacinar connective tissue; at other times the increase was principally in the interlobular connective tissue, though in this type there always existed some increase in the intralobular connective tissue too. The head and tail of the pancreas seemed to be affected first and exhibited the most extensive changes. In a case of pigmentary cirrhosis of the liver there was also marked pigmentation of the pancreas. The islands of Langerhans presented usually some alterations which, however, except in the cases of diabetes, were marked neither in degree nor extent and consisted in slight thickening of the capsule or vessels and degenerative changes of the epithelium. In two of the cases of diabetes there was hyaline degeneration. Increase or thickening of the elastic tissues of the organ was often noted. The weight of the pancreas varied from 32 to 150 grams. The form of the cirrhosis, whether atrophic or hypertrophic, made no difference in the microscopic picture of the changes in the pancreas. Two principal causes for the lesions in the pancreas are discussed. It is possible, first, that the changes in the pancreas may be the sequence of a chronic passive congestion following the cirrhosis of the liver; or, secondly, the etiological factor in the production of the cirrhosis of the liver may also be the cause of the changes in the pancreas. In most of the cases the author adopts the latter view, regarding alcohol as the etiological factor. In a few instances he believes that the pancreatic lesion followed directly from the cirrhosis of the liver.

The Spinal Changes in Polyneuritis of Tuberculosis. Though the literature upon polyneuritis in tuberculosis is rather extensive, comparatively few observations have been made upon the condition of the spinal cord in this disease. TAUBER and BERND (*Zeit. f. Heilk.*, 1905, Bd. xxvi. p. 371) report the results of a study of 13 cases of well-marked polyneuritis occurring in pulmonary tuberculosis. Eight of these showed very definite alterations in the spinal cord and six slight changes. Cases of tuberculous meningitis were excluded, as well as those instances in which inflammations in the nerve were directly associated with a tuberculous process. The symptoms of neuritis usually come on gradually and seldom developed acutely. In the majority of the cases the peroneal nerves, usually on both sides, were affected. Involvement of the radial nerves was rarer, though in a few cases all four extremities were affected. The clinical symptoms in the cases described were typical. Examination of the spinal cord by the Marchi method and other techniques showed a very definite degeneration affecting systems of nerve tracts. The seat of this degeneration was usually in the posterior columns and involved in the majority of cases the column of Goll, although occasionally the columns of Burdack were also diseased. Together with these changes there was a degeneration of the posterior nerve roots, almost always more pronounced in the lumber region than in the cervical portion. A comparison of the extent of the lesions in the posterior nerve roots and posterior columns showed certain incongruities in the relationship, so that an ascending degeneration and dependence of one lesion upon the other could not always be demonstrated, though in certain instances the changes were such that it seemed permissible to conclude that an ascending degeneration had taken place. The anterior roots were rarely degenerated. In only one specimen was there a degeneration of Schultz's comma tract. In one or two cases old degenerations were found in the pyramidal tracts, and once the direct cerebellar tract was involved in the cervical region. The extramedullary portions of the posterior and anterior nerve roots were found free from pathological alterations in all cases.

The authors conclude that the spinal-root changes are more extensive than would be necessary to explain the disease of the nerves clinically.

The spinal-cord changes are fully co-ordinate with the changes in the peripheral nerves. Polyneuritis of tuberculosis is a disease which can affect the entire nervous system.

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